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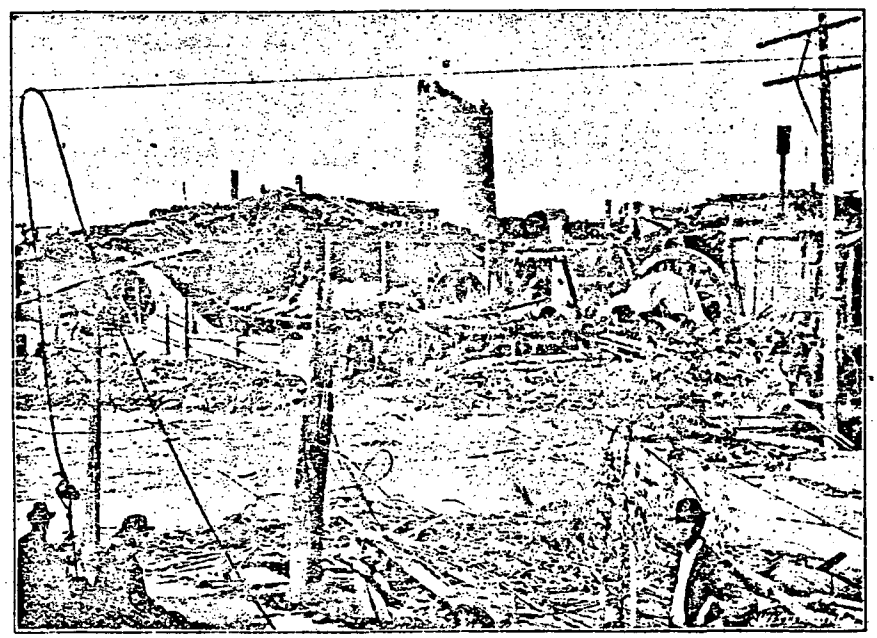
The St. Louis Tornado.

On Wednesday evening, May 27th, St. Louis was visited by one of the most destructive tornadoes of modern times. The day had been unusually sultry and oppressive for a May day, but it was not until 4:30 that the conditions of the sky gave any indications of a serious outcome. About 5 o'clock the heavens were murky with mountains of clouds that rolled and tumbled as if impatient for the signal when they should burst with all their fury and add their blinding streams to the fleet fierce winds that would soon shatter their chains and, unbridled, sweep with the breath of death over the defenseless city. The advancing masses of clouds came together over the western part of the city, and against a background of the various tints of green was witnessed the most brilliant electrical display ever seen in St. Louis.

The tornado, coming from the southwest, first struck Compton Heights, a thickly populated section with a large number of very costly mansions. Then it made its way down what is known as Mill Creek Valley to the river, tearing down in its course whole rows of smaller dwelling houses, many of them occupied by more than one family, and ruining thousands as it went. When it struck the Mississippi River it cleaned the harbor of the steamboats and other crafts, dashing them wildly across to the Illinois shore, breaking them into pieces and drowning the unfortunates who were aboard. Even the Eads Bridge failed to entirely resist the force of the terrible storm. The wind tore away some three hundred feet of the eastern approach, blew over freight trains which were standing on the tracks, and then entering East St. Louis, it came near blowing that town out of existence.



WRECK OF THE UNION DEPOT RAILWAY POWER-HOUSE.

It was all over in a few minutes, and then came a blinding rain, adding to the discomfort and suffering of the injured, and increasing ten-fold the difficulties in the way of thousands of rescuers, who were speedily at work trying to remove wreckage and save the lives of those who were imprisoned in what was in many instances a living tomb.

The evening and the night which followed was the most wretched a large city has ever known. For a time every street railway was tied up. Two power-houses were completely wrecked, and of the 300 miles of electric road scarcely twenty could be operated before morning. Thousands who were on the cars had to walk home as best they could through the blinding rain and amidst masses of wreckage of every description. The agonies of the tens of thousands who were still down town can be scarcely appreciated. Reports of whole sections of the city being blotted out came in rapidly and no one knew whether his loved ones were killed or not. The electric light plants were temporarily rendered unserviceable, and darkness added horror to the situation. The suffering and labor of the walk home which followed will be remembered for years by thousands. Some reached their homes towards midnight, only to find them wrecked and their loved ones dead.

The extent of the calamity was so enormous that it could only be realized by degrees. All night long efforts were made to rescue as many as possible from the ruins, but it was not until morning that the peo-

ple who had escaped injury were aware of the frightful loss others had sustained.

The business section of the city with its sky-scrapers escaped in a miraculous manner. The northern portion of the city and the extreme west end also escaped the fury of the storm; but the southern section received the tornado with its full force. Commencing in the southwestern portion of the city it took a zigzag course, more than three miles long and a mile wide. Within this area scarcely a building remained uninjured, if not entirely destroyed. The power-house of the Union Depot Railway system, one of the largest electric railway systems in the world, could not resist the fury of the storm. Its immense brick smokestack, which could be seen from a large portion of the city, snapped asunder, and machinery worth hundreds of thousands of dollars was buried in the ruins. The power-house of the People's Railway Co. (cable system) was also demolished. The City Hospital, overcrowded with patients, was partially destroyed, and it was at first thought that hundreds of sufferers were killed. However, the loss of life in this building was comparatively small, although the suffering which fell upon many was enormous. Liggett & Meyers' tobacco factory under course of construction, at a cost of $1,500,000, sustained a loss of $150,000 in addition to a number of lives.

In the section of the city where perhaps the relative destruction of life and property was greatest, from Chouteau avenue to Lesperance street, and east of Tenth street, a scene of desolation and disorder, horrible to even contemplate, was revealed by the daylight of Thursday. This district was right in the path of the storm, and its inhabitants, most of them belonged to the laboring class, rank among the worst sufferers. Their property, in most cases, did not extend beyond scanty household furniture, or, perhaps, included the home they inhabited. Thousands were rendered homeless and practically destitute, many families being without food until relieved by the charitable. The bread-winners had in many cases been killed, and even when this was not the case, the destruction of adjoining factories removed all hope of earning a trifle to support the women and children. Being essentially a laboring district, this feature of the calamity was more obvious and appalling.

The number killed in St. Louis and East St. Louis will reach about 400, while the number injured will reach nearly 2,000. The damage to property will be near $50,000,000. Hundreds of miles of electric wires and thousands of telephone, telegraph and electric light poles were dashed to the ground, and the city was in total darkness for ten days, while the street lights in the storm district are not yet replaced.

Since the storm hundred of thousands of people have visited the city, some through curiosity, others seeking work.

There was at first great demand for mechanics, but soon the supply exceeded the demand, and in that respect St. Louis now resembles Chicago after the World's Fair. The rush of electrical workers to St. Louis reminded one of the rush to Cripple Creek on the first announcement of the discovery of gold. Where did they come from? God only knows. Forty-eight hours after the storm it was estimated that 2,000 linemen had arrived in the city, and such a job lot were probably never together before. There were good linemen and poor linemen; linemen with "hayseed on their back;" "bum" linemen and "full" linemen, and linemen who had seen better days. However, for the first few days there was work for all. If a man found a pole too greasy, or if he found it difficult to maintain his equilibrium a few feet above ground, there was plenty for him to do on the ground where his footing was more sure. The men worked from daylight until dark, which means at this season about two days in one. This was too much prosperity for some, and after the first pay, work no longer agreed with them, "and they folded their tents like an Arab and gently stole away."

All the street cars are now running, although it will take months to get the lines in as good condition as they were before the storm. The street lights are again burning in all sections of the city except the cyclone district, but with the large force of men at work, these will soon be going. The telephone company was crippled worse than any of the other wire using companies, but is rapidly resuming its service, and soon the "hello" girl will be able to connect subscribers in all parts of the city.

LONG-DISTANCE TELEGRAPHY.

An Interesting Event During the Electrical Exposition in New York in May.

A marvelous feat in long-distance telegraphy was performed on Saturday evening, May 16th, during the delivery of an address by Dr. Chauncey M. Depew in the hall of the National Electrical Exposition on the "Progress and Future of Electricity." To demonstrate the promptness of modern telegraphic science, messages written by Dr. Depew and by Edward D. Adams, President of the Cataract General Electric Co., were transmitted nearly simultaneously by both the Western Union and the Postal companies on circuits estimated at 27,500 miles each, from New York through several continents and returning to New York.

Mr. Depew's message was addressed to Mr. Adams, because that portion of the Postal Co.'s circuit between New York and Buffalo was energized with electricity generated by Niagara Falls at the plant of the Cataract Co., of which he is the President.

These demonstrations of the annihilation of time and space by means of modern telegraph facilities are the most extensive that have ever been undertaken. The invention of instruments and the construction of the vast system of telegraph lines and cables which make these remarkable feats possible have all been the work of scarcely more than fifty years and a large portion of it the last half dozen years. No better illustration of the world's progress during the latter half of the nineteenth century could possibly have been devised. The men who handled the messages in the hall are older than the science of which they are the masters, and there were many present who remembered the occasion of the sending of Morse's world-famous first message of "What hath God wrought."

AS DONE BY THE WESTERN UNION.

New York, May 16—Chauncey M. Depew, New York—[Via Tokio, Bombay, Lisbon, London, Canso, Montreal, Vancouver and San Francisco]—Mighty Niagara, nature's wonder, serving man through the world's electric circuit, proclaims to all peoples science triumphant and the benevolent Creator. EDWARD D. ADAMS.

Charles A. Tinker, General Superintendent of the Western Union company, acted as sending operator for his company. The receiver was Superintendent L. C. Baker of St. Louis. This company made up a circuit between New York and Galvestion of about 10,000 miles. It went via Chicago, San Francisco, Los Angeles and St. Louis. At Galveston the message was handed to the Mexican Telegraph Co. and the Central and South American Telegraph Co., who transmitted it about 6,500 miles, by way of Mexico, San Juan, Nicaragua, St. Elema, Ecuador, Chorillos, Peru, to Valparaiso, Chile. Thence it went by land line over the Andes Mountains to Buenos Ayres, where it was handed to the cables of the River Plate, the Western and Brazilian, and the Brazilian Submarine Telegraph companies, and sent about 6,000 miles, via Rio de Janeiro, Pernambuco, St. Vincent, to Lisbon. From Lisbon it went over the cables of the Eastern Co., about 1,000 miles, to Penzance, England. Thence it came over the Western Union Atlantic cables via Canso to New York, about 4,000 miles. The total circuit over which the message traveled was, therefore, 27,500 miles in length, practically encircling the Western Hemisphere, but crossing the Atlantic and touching Europe on its return.

The answer was received over the Western Union circuit twenty-one and one-half minutes after it started on its journey of 27,500 miles. The land line was 7,387 miles in length, the longest circuit ever worked in the history of Morse telegraphy. The time occupied by a single letter in traveling over this land line was, as closely as could be timed, three seconds. While the messages were on their travels a glass arrow hanging over each instrument flashed a blue etheric light, indicating the direction and the arrival at important points.

Night Chief J. C. Barclay, of the Chicago office, made up the circuit in which the messages passed through that city, and copied them as they passed. The wire from Chicago to Galveston was one of the company's best duplex. It was, in fact, a continuous copper wire from New York to Chicago, from Chicago to San Francisco over the Union Pacific route, thence to Los Angeles over the Southern Pacific, and back to Chicago over the Atlantic and Pacific and Santa Fé, from Chicago to St. Louis via the Chicago & Alton, and St. Louis to Galveston over the Iron Mountain. This 7,387-mile circuit was covered without a relay, although there were repeaters at Chicago, Omaha, Cheyenne, Ogden, Reno, San Francisco, Los Angeles, Flagstaff, Pueblo, Kansas City, St. Louis, Little Rock and Galveston.

At Galveston the message was transferred to the Mexican lines for transmission to Valparaiso. Thence it went to Buenos Ayres, back to Rio Janeiro, from there to London, and thence to Canso.

Before the passage of the message the duplex system was tested with a dummy message and everything found to be in perfect condition.

ROUTE OF THE POSTAL MESSAGE.

New York, May 16.—Edward D. Adams, New York—[Via San Francisco, Vancouver, Moutreal, Canso, London Lisbon, Bombay and Tokio.]—God created, Nature treasures and science utilizes electrical power for the grandeur of nations and the peace of the world.

CHAUNCEY M. DEPEW.

Col. Albert B. Chandler, President and General Manager of the Postal Telegraph company, acted as the sending operator on the lines of his company. The circuit on which he transmitted the message was made up via Chicago, Los Angeles, San Francisco, Vancouver, Winnipeg and Canso, thence to London and back via Boston to New York. President Chandler was stationed in the north balcony of the exposition hall. He started the message on its long journey at 8:34 o'clock. The receiving operator was Thomas A. Edison, the inventor, who is a practical telegraph operator. He was stationed in the south balcony and handed Mr. Adams a beautifully written copy of the message at 8:38, four minutes after Mr. Chandler had transmitted it.

When the message reached London a copy was handed to the Eastern Telegraph company and was forwarded by it over various lines and cables via Lisbon, Gibraltar, Malta, Alexandria, Suez, Aden, Bombay, Madras, Singapore, Hongkong, Shanghai and Nagasaki to Tokio, Japan, returning thence via London, and reaching the exposition hall at 9:24. The distance traveled was 15,000 miles.

The instruments used were of the latest Postal Telegraph pattern, with aluminum levers. They are handsomely mounted on an ebony base, and will be presented to the Smithsonian Institution in Washington, together with attested records as to time occupied in transmitting the message and copies of every newspaper in the world in which the occasion may be noticed. These will be carefully preserved by the Smithsonian Institution as evidence to future generations of the advanced state of electrical science in this year of 1896.

DR. DEPEW'S SPEECH.

"The fables of antiquity are the facts of to-day. The poetry, genius, and learning of the ancient world ascribed to the gods of Olympus marvelous achievements in rapid transit, the transmission of intelligence, and the metamorphosis of matter. These wonders of the imagination where the inspiration of the ancients in their religion, their literature, and their life, and to them the poetry, eloquence, and philosophy of the modern world are largely indebted. Though the high intelligence and superb culture of Greece and Rome remained blindly superstitious before the miracles of mythology, Jupiter and Hercules, Apollo and Minerva are commonplace persons when compared with Morse and Edison, with Bell and Tesla.

"History is a dreary record of the conflicts of ambition and power, and the horrors, desolations, and the devastations and miseries created by war. While for thousands of years the antagonism and energies of the rulers and leaders of mankind have been concentrated upon policies and actions which destroyed the possibilities of happy and comfortable living upon this planet for the masses of the people, the present century is distinct and distinguished not only in winning plaudits for making two blades of grass to grow where only one grew before, but for rendering it possible for millions to subsist in comfort and lead happy lives where thousands had dwelt in poverty and ignorance.

"The most practical philosopher who ever lived was Benjamin Franklin. Theory and discovery were worthless, in his judgment, unless they could be utilized for some beneficial purpose. The kite, the string, and the key in his hands wrested from nature her secret that the air encircling the globe is the exhaustless storage battery of electricity. It had taken all the intervening time from Adam talking to Eve in the garden of Eden over love's telegraph of leaves until Morse's wire to utilize electricity.

"But the energy of this liberated and educated spirit of the air stimulated the human brain to limitless endeavor and miraculous achievement. Ten years elapsed and then under the Atlantic Ocean was sent over the cable, from the Queen of Great Britain to the President of the United States the message of friendship and peace between the English speaking nations of the world. Twenty years later the telephone, lengthening the lovers' telegraph from feet to miles, has annihilated space for the sacred confidences of the family and the negotiations of business.

"Thirty years ago there were 75,000 miles of wire in the United States; to-day there are 1,000,000 miles. Thirty years ago 5,000,000 messages were annually transmitted by telegraph; now there are 60,000,000. In a quarter of a century the reports of the telegraph companies have increased from $7,000,000 to $25,000,000 per year.

"Since the opening of the telegraph the imports and exports of the United States have grown from $220,000,000 to $1,600,000,000, while the internal commerce of the country from about $1,000,000,000 has reached the fabulous figure of $25,000,000,000 a year. In twenty years the use of the telephone has become such a necessity in our daily life that the mileage of the telephonic wires has increased to 600,000 miles and the number of telephones to 700,000.

"This exposition illustrates another beneficent advance in electrical developments. It suggests an opportunity of escape from territorial limitations of coal and the prohibitive cost of transportation. Wherever there are mountains and lakes there is water power. That this power can generate electricity has been known, but its usefulness has been handicapped because the mill and factory could not be readily transported.

"The most sublime concentration of continuing force in the world is Niagara Falls. We are here, 450 miles from Niagara, and witnessing that the power generated there can be transmitted here. It is a demonstration of incalculable value. It will redeem the waste places of the world. The tumbling torrent will come to be the treasury house of nations. Wherever water flows electrical power may be generated, which transmitted great distances, will create the mill, the factory, and the furnaces, and give that employment to capital and labor which relieved the farmhouse of its surplus of boys and girls and gives the farm the profitable market in a neighboring seat of population and industry."

Twenty Years' Progress in Telephony.*

BY S. G. M'MEEN.

(Continued from May Issue.)

Somewhat prior to the invention of the telephone there had existed in New York a telegraph exchange, designed for the purpose of connecting together private lines radiating from a central point to the offices of law firms. Upon call from a telegraph subscriber to this exchange his line would be connected to that of another subscriber and telegraph conversation could ensue as long as desired. In this was probably the germ of the

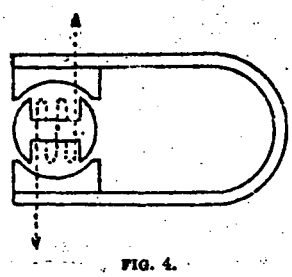


FIG. 4.

modern telephone exchange. The earliest such office existed in Boston, and had, at a time of its early prosperity, as such, four subscribers. From this time forward the growth was rapid and telephone exchanges were installed upon that plan in this and other countries. There has been no important change in the fundamental method of working, the plan to-day being almost identical with that of the telegraph law exchange before mentioned.

Coincident with the necessity for providing each individual desiring connection with an outfit of speaking apparatus, and the proper line to a central point, there remained other steps to be taken. The subscriber must have the ability to signal to the central station in some manner, advising the attendants at that point of his desire to connect with another. That other, in turn, must have a means for receiving a call from the central station; the lines having been connected together and the conversation held, the central station attendant must know when to disconnect their circuits and restore them to the normal condition of giving and receiving calls.

In all original installations upon this basis it was only natural that battery power should be used for signaling purposes and the Morse relay was originally much in evidence. The necessity for the provision and maintenance of a gravity battery or its equivalent in large units early became a serious drawback. The subscribers' battery installations were therefore soon replaced

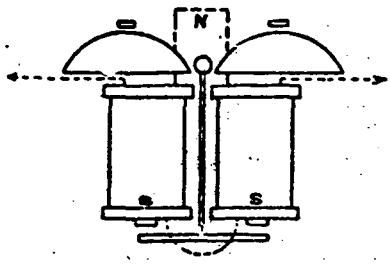


FIG. 5.

by a mechanical generator of current designed to transform the energy of beefsteak into the energy of electricity. That is to say, the subscriber was then provided with a mechanism to be operated by hand motion. Current from chemical action was therefore temporarily banished to reappear in another and then unexpected form, at a later date.

The necessary mechanical features of such a generator are shown in outline in Fig. 4 and the ringer which responds to its currents in Fig. 5. It will be noticed that this ringer is merely a polarized relay provided with gongs instead of local contacts.

Passing to the central office end of the line, and omitting as of little general interest the transitory forms of call receiving apparatus it may be stated in a few words that the form of electric magnetic signal shown in the sketches herewith has been almost universally used in telephony from the date of early general application. You are all familiar with the fact that the same process is necessary to call the central office and to signal for disconnection or "ring off." The electro magnetic device operated by your turning of the crank is precisely similar in form in either case. Its location mechanically at the central office distinguishes a call for connection from a call for disconnection. The general form of such an annunciator is shown in Fig. 6. The attraction of the armature lifts the catch and allows the shutter to fall.

So far we have taken into consideration not at all the manner of connecting together subscribers' lines at the central office. This has been accomplished by many forms of switchboards, metal strips and plugs of telegraphic familiarity included, but complete success in rapid switching has only been found in devices utilizing flexible cords with plugs as terminals, these cords and plugs forming connecting links for subscribers' lines on the central office switchboard. Being provided with these cord and plug links it is only necessary that the operator possesses ability to speak by telephone to a calling subscriber and to signal electrically any subscriber for whom she may have a call. For the first consideration it is only necessary to give her a telephone. For the second she must have some apparatus for sending a proper ringing current over any one of the connecting cords in her possession. This was done originally by means of the battery, as has been stated, but later on the addition of the polarized relay and its attendant gongs to the subscribers' equipment, this ringing was, and is,

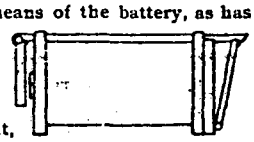


FIG. 6.

accomplished by means of an alternating current having a frequency of 900 to 1,000 per minute. Such alternations are now derived universally either from magneto generators driven by belt from a source of power, or by rotary transformers converting direct current into the desired alternating form.

Disregarding for the moment the connecting links of cords and plugs with their ringing and

* Paper read before the Chicago Electrical Association, March 6, 1896.

speaking apparatus, it will be seen that each subscriber's central office equipment consists simply of a spring-jack for the operator's connection, and an annunciator for the call announcement, the clearing out signals belonging distinctively to the cords and forming no portion of the subscriber's line terminals properly so considered. It has been found possible to place within the reach of one operator several hundred such line terminals, and if the telephone were of no greater importance than it is to the average subscriber it would be probably expedient to still further diminish the size of these line terminal units in order to place a greater number of them within easy reach of a single operator. The reverse is, however true, and while early switchboards were built so as to provide 100 line terminals per operator the line traffic has so increased as in many cases to much reduce this number. That is to say, it was found in a telephone exchange of but 100 lines one operator could attend to all the calls from those subscribers during the busiest portion of the day. In an exchange of 200 average lines it is further found that two operators can attend to all the calls, and with the usual arrangement of apparatus either operator can reach any one of the 200 subscribers' line terminals, either for answering or giving a call. Considered upon this basis it would be true that in an exchange of 500 subscribers with the same amount of business from each, the mechanical limitations would be such that no one operator could reach more than her own 100 lines and the 100 on either side of her, or 300 in all. She must, therefore, have some means of connecting with the remaining 200 subscribers, or else so train her calling 100 as never to ask for connections beyond her reach. The latter is evidently out of the question. There have, therefore, been devised two general methods of extending the operator's reach beyond the mechanical one. It is but natural that the first attempt should have been in the line of extending by special local circuits the operator's reach electrically, thus giving her the ability to ask a distant operator to connect a certain subscriber by a certain local line or trunk, as they have been termed. Electrically there is no objection to this, but in practice it was soon found that connections for 200 subscribers outside of the reach of an operator were retarded in time by reason of the work requiring two persons to complete it. The second and far more successful method has been found to so multiply the points of access to any line as to place every circuit in a large office within reach of every operator. So was born the multiple switchboard and so it exists to-day.

Generally speaking a multiple exchange switchboard is simply this: Each line enters the central office switchboard, and, at intervals of about six feet, which is found to be about the maximum mechanical reach of any operator right and left, that line appears at a spring-jack. Three operators may be seated before the switchboard within this space of six feet. Tracing further the passage of such a line through a large switchboard, we find it reappearing at a spring-jack as many times as there are sections of a switchboard six feet in length. Each line is provided in a suitable manner with an annunciator as in the forms of switchboard having no such multiplication of spring-jacks. This annunciator is not multiplied in number, there being but one for each line. The annunciators are grouped together and a certain number (50 to 100) is attended by each operator.

It is to be borne in mind that the sole object of such an arrangement of circuits in a telephone central office is to place all the lines of such an exchange within easy reach, for connection, of every operator, while giving to each of the necessary operators a limited number of lines from which to take orders and for which to make connections. In order that one operator receiving a call for a given line may not connect the calling subscriber with that line while it is in use for conversation, it is necessary to provide some means by which she may know whether or not the line called for is already in use or "busy." Many devices of great ingenuity have been produced for this purpose, but that which has been found most satisfactory is an arrangement of one form or another whereby the operator desiring such connection may simply touch the tip of the connecting plug, which she is about to insert into the spring-jack of a given line, to the metal of the spring-jack before so doing. If this line is engaged for conversation, the operator will hear in the telephone receiver which she continually wears, a click, known in the language of the craft as a "busy test." In the absence of such "busy test" she will make the connection and call the subscriber in the usual manner.

Considering the matter of station equipment and central office apparatus as sufficiently described for the present, attention must be given to an equally vital portion of the telephone plant, viz., the line. When it is recalled that the only electrical circuits for transmission of any character, existent at the date of the first telephone exchange, were telegraphic, and that for such purpose single grounded iron wires were then exclusively used, it is not to be wondered at that just such circuits were adopted for telephonic service as well. For limited distances the availability of such circuits was in a large degree satisfactory. With the multiplication of subscribers' lines, however, it was soon found difficult to carry these singe open aerial wires in sightly and secure manner upon aerial supports and to bring them conveniently into a central office. Recourse was then had to aerial cables containing a large number of conductors. With the existence of this method of circuit distribution came disturbances from "cross talk"; this term being applied to induction interferences, from various causes, between narrowly separated circuits.

With the advent of the street railway, extraneous disturbances were greatly magnified and in many cities the greater portion of the entire exchange rendered practically inoperative. When it is remembered that the earth itself largely forms a return for such street railway systems as are to-day in operation, and that wide differences of potential exist between the center and the outskirts of any town having such traffic conditions, it will be readily understood why the one system disturbs the other. As a means of escape from these evils without excessive expense in construction, recourse was had to common return wires. By this is meant a return circuit of low resistance for each general route of conductor distribution to which the former ground wires of the various lines are attached after leaving the subscribers' instruments. At the central office these conductors are united together and substituted for the former actual earth connections. The entire plant is thus freed from ground connection at any point. The common return wire, however, has not been found a complete panacea for all telephonic evils; cross talk due to proximity of wires remaining unchanged. This character of disturbance is due almost wholly to the electrostatic capacity of the conductors, their mutual action upon each other electro-magnetically having little bearing upon the case. That is to say, if for a few hundred feet of cable length the capacity of the two conductors be mutually low and their conductivities high, there will be mutually little disturbance. If, however, the capacities be large, the conductivities remaining permanent, the mutual disturbances may be so great as to prohibit an undisturbed use of both at the same time for conversation. The same difficulty has been experienced upon long open aerial wires, the additional length making up for the diminished disturbance due to greater separation.

In exchange circuits exclusively, by reason of their being limited to but a few miles, noises due to atmospheric electricity are not marked, whether those circuits be grounded or otherwise. In interurban communication, however, requiring lines of many miles in length, electrostatic disturbances from atmospheric causes are very pronounced. The character of these disturbances is very peculiar and has served not only to seriously disturb attempted conversation over long distances, but has formed a topic for study and investigation of no small importance. It is quite likely that future investigations of atmospheric conditions for purely scientific purposes may be greatly aided by these phenomena, but they have so far been a pronounced cause of unsatisfactory telephonic communication.

We see, therefore, that in the province of telephone line interference there are three necessities demanding cure: First, mutual conflict between telephone circuits; second, mutual conflict between telephone and other electrical circuits; and, third, disturbances from natural causes. There are in existence devices intended for application to the line without changing its form, which have been the result of great thought and ingenuity, and have, in greater or less measure, accomplished their object. In no single instance, however, has a result of high order been achieved, and none except at a loss of value in transmission.

Over ten years ago, however, attention was turned to the improvement of the condition of the line itself, and the result, generally speaking, has been the production of a method of construction providing a high grade telephonic circuit. In brief, this result was arrived at by providing a metallic circuit of two wires with no earth connection. It is essential for the construction of such a circuit to provide the two conductors with exactly the same resistance, capacity and insulation, and with the nearest approach to the same physical condition for each wire. Placing the wires very close together in such a circuit assists in eliminating disturbances from outside causes, but increases the mutual capacity from wire to wire. In practice, it is found that two wires of any length of the same material and size, will produce a circuit almost wholly free from atmospheric disturbances and those due to reasonable distant circuits carrying heavy currents. Two such circuits, however, unless an additional precaution be taken, will seriously mutually interfere. A system of mutual transposition of the two wires of a circuit as to mechanical position has therefore been devised, having for its purpose the elimination of this metal interference.

It is possible, by means of these precautions, to erect upon a given structure any desired number of separate and distinct metallic circuits entirely free from mutual and external disturbances of any character. It is possible over such circuits to carry on as satisfactory conversation as can be held between two individuals, face to face, under the most advantageous conditions. It is possible by means of a reasonably simple system of auxiliary apparatus to carry on one circuit in addition to an ordinary speech conversation, two separate and distinct conversations by Morse telegraphy at the same time, making simultaneous telegraphy and telephony over a single circuit entirely feasible commercially.

There is not the slighest reason to doubt that conversation between San Francisco and Boston will soon be accomplished.

Considering for a moment the physical character, from an engineering standpoint, of the New York-Chicago circuit, it may be stated that the supports are generally thirty-five feet in height, the conductors, of hard-drawn copper No. 8 B. W. G. .165 in. diameter, having a capacity of a little over .015 microfarad per mile each to earth. The capacity from wire to wire, which is the important characteristic in considering speech carrying power, is about sixty per cent of the capacity of one wire to earth, or .009 microfarad per mile of circuit. Roughly speaking, the resistance per mile of wire of this gauge is two ohms, making the resistance of the New York-

Chicago circuit 4,000 ohms, and the capacity from wire to wire nine microfarads.

The range of frequencies of the currents used in speech transmission correspond, of course, to the frequencies of the actual vocal waves, varying between 120 and 600 per second. With these frequencies and the functions above mentioned, five parts in 1,000, or one-half of one per cent of the original currents become effective at the receiving end. The amount, however, is sufficient to produce a volume of tone not noticeably less than that received over much shorter lengths of line. So that in this branch of the electrical transmission the variables take somewhat unusual values.

RESULTS ACCOMPLISHED

In Distribution of Light and Power by Alternating Currents.*

BY W. L. R. EMMET.

In the past the use of alternating currents has been almost exclusively for incandescent lighting, and this narrow limitation has crippled the development of the art. While the applications of direct currents have called forth very large investments in plants and distributing systems, the uses of the alternating current have, as a rule, been on a much smaller scale, and the methods used have been developed rather with a view to reduction in first cost than to the attainment of the most economical results in operation.

The reasons for this somewhat half-hearted development may be stated as follows:

First—The average efficiencies attained in most alternating plants have been very low.

Second—The distribution of potential obtainable with the ordinary methods has been imperfect.

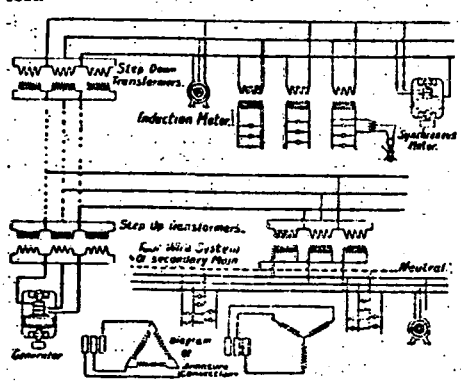


FIG. 1.

Third—No reliable alternating arc lamps have been available.

Fourth—No practical form of single-phase alternating current motor has, up to the present time, been introduced.

At no time have all these difficulties been entirely unavoidable in alternating current distribution; they have, however, been fixed features of the system as it has in the past been installed by our manufacturing companies and used by electric light companies in this country, the state of the art being such that improvements were beyond the reach of most central station managers.

In recent years great developments have been in progress in the branches of electrical science pertaining to alternating currents; much new apparatus has been developed, plants have been installed on new lines, and practical results are to-day being accomplished that show that it is possible to overcome all the objections which have been mentioned.

We will briefly review in order some of the means by which the difficulties mentioned have been and can be avoided.

Efficiency.—The greatest losses in the average alternating plant are due to the waste in iron cores of transformers, which goes on whether the transformers are loaded or not. This waste can be reduced, either by the use of transformers of high light load efficiency, or by arrangements for cutting out transformers at light load.

Where primary distribution is used with large numbers of independent transformers, the extent to which these remedies can be adopted is very limited, since reduction of core loss can be obtained only at the expense either of regulation or of first cost.

If, however, secondary distribution is used, that is, low-tension mains with transformer sub-stations, it is often possible to arrange means of cutting out transformers at times of light loads.

Furthermore, on such systems very accurate regulation in transformers is a matter of no importance, since all transformers divide the load more or less evenly between them, instead of operating from the same line at various conditions of load as in primary distribution. Thus, for this secondary work, we can build special transformers having very small core losses and thus obtain very high all-day efficiency without impairment of regulation.

In no branch of electrical work has the improvement of recent years been more marked than in the manufacture of transformers. This improvement has not been brought about by any radical discovery as to the principles involved, but simply by study of the economic conditions. The quality of iron is a most important matter in building transformers, and the methods of handling and annealing are almost equally so. Then the proportions by weight of iron and copper may be varied through a wide range, and the plan of arrangment of coils and iron are susceptible of endless variation. Every change of plan may affect the properties of the transformer as to self-induction, magnetizing current, hysteresis, eddy currents in core and copper, resistance loss and regulation. Thus there is much room for judgment in design or purchase of transformers. At the price for which transformers can be bought it is folly to use bad ones. Thousands of transformers are in use to-day that are fit for nothing but the scrap pile, and many are now being manufactured and sold that are no better.

Regulation.—The cause of bad regulation in most existing alternating plants is that each individual installation is connected to a separate transformer, and that in these transformers, and the wiring connected to them, there are losses varying with the load, which, of course, cannot be controlled from the station. Since regulation is a matter of most vital importance, we see that with primary distribution good regulation in transformers is imperative. To make transformers of specially good regulation, something must be sacrificed, either in economy of first cost or in light load efficiency, or in both. Thus there is always an appreciable drop through resistance of wire in transformers, and this, combined with the drop in primary and secondary wiring, gives rise to serious vibrations in pressure on lights at different points.

Another fruitful source of potential variations on alternating circuits is found in the self-induction of circuits and also in the self-induction of transformers. The electromotive forces introduced by self-induction, being out of phase with the current, are variable in their effect, and give rise to troubles that sometimes seem erratic, although in reality they are governed by well-defined laws, which, if properly observed, enable us to obtain accurate results.

Motors.—Until very recently the operation of motors from alternating systems has been practically out of the question, since no suitable motor has been obtainable. Thus alternating apparatus has been available only for lighting, while in direct-current stations motor load during the day has been a most important source of profit. It may be mentioned here that while incandescent lighting is at the present time meeting sharp competition from either forms of illumination, the electric motor is growing very rapidly in popularity. It has taken the public a long time to gain confidence in electric power and to realize its usefulness. It is only within very recent years that large manufacturers have begun to use electrical power distribution to any great extent. At present the work is being carried on very actively and highly successful and economical results are being obtained in many large mills.

Although for many years efficient electric motors have been in general use, there are many central stations in whose business power distribution has not been a very important factor. There are several causes which have tended to restrict the use of electric power, among which we may mention the following:

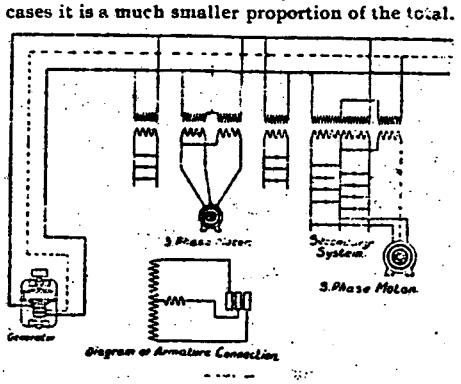
Voltages that have been available for direct-current work have not admitted of transmission to considerable distances.

Motors have required a certain amount of attention which users were sometimes unwilling to bestow.

In certain classes of manufacture, the sparking of motors has been a source of danger.

The most important cause, however, has been that, as a rule, the same apparatus has not been available for the operation of lights and motors; consequently central stations have not been in a position to make attractive propositions to large users of power.

The actual saving in fuel effected in the operation of a large mill by electricity for power distribution is ordinarily very large, often as much as fifty per cent. With good equipment, this is, however, only a small part of the saving effected by electrical distribution. The cost of coal seldom amounts to more than half the expense incident to the production of power, and in most cases it is a much smaller proportion of the total.



If power is obtained from a central station, the coal is bought cheaper and used more economically, while the other items of expense will in many cases be almost a clear saving.

The introduction on any large scale of electrical power distribution, of course, requires the investment of a good deal of money in motors and alterations of plant. Power users are often slow to make these investments, because they are not familiar with electrical apparatus and do not realize the advantages to be gained. Repeated investigations have proved that users almost always far underestimate the cost of power. It is the business of the central station manager to correct these misconceptions, and to awaken interest in electrical methods. Of course, many companies are working zealously just on these lines. There is no question, however, that there is in many of our large cities a large amount of undeveloped power business. If electrical manufacturers can induce large mill owners to put in plants for electrical power distribution, central stations should be able to sell power to similar concerns.

The different methods of distributing power and light by alternating currents can best be illustrated by diagrams showing the connections used with each. We will briefly review some of the applications of the systems now in general use.

*Abstract of paper read before the National Electric Light Association, New York, May 5-7, 1896.

Fig. 1 shows the three-phase system as ordinarily applied to the transmission of power for lighting and other purposes over long distances. The generator may be of any convenient voltage, since step-up transformers are used. These transformers are in three units, or groups, any two of these units being available to transmit a large proportion of the power in case one is disabled. Two sets of step-down transformers are shown, one supplying 1,000-volt distributing lines, and the other supplying a system of four-wire secondary mains. With a given lamp voltage, such mains give a slightly better copper economy than the ordinary three-wire system, and afford an excellent means of secondary distribution.

Such a system as is illustrated in this figure will give excellent service in almost any town, the low tension mains taking care of the thickly built up portion and carrying the bulk of the lighting load, while the high-tension distributing system covers all outlying portions and operates large power units. A number of large plants have been installed within the last two years, using the three-phase system as here shown.

Fig. 2 shows the connections for distribution by the monocyclic system. Here all lights are connected single-phase between a single pair of conductors leading from the generator, the motors being operated from the same single-phase circuit in combination with a third conductor leading from what is known as the "teazer coil" on the generator. Here the simple three-wire system is

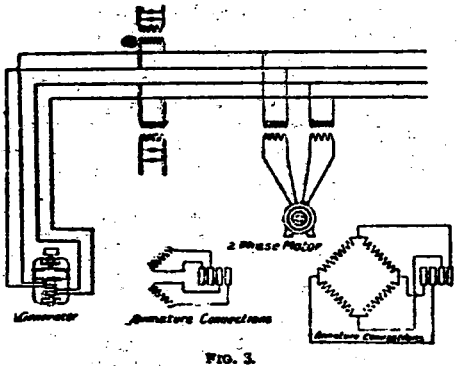


FIG. 3.

used for secondary distribution, and if it is desired to connect motors to the low-tension mains, a supplementary transformer is used, which supplies a secondary teazer wire; to this and the outside wires of the three-wire system the motors are connected.

The great merits of the monocyclic system are that the number of conductors required for lighting and power distribution is reduced to a minimum, and that no unbalancing is possible. The operation of three-phase motors from this system is in all practical respects the same as when they are run from three-phase circuits.

Fig. 3 shows the connections of the two-phase system, with distribution by four conductors. Here the lighting is divided between two separate circuits, which must be kept balanced within certain limits, depending upon the regulation of the generator or the amount of care that can be given to the adjustment of pressure on the different sides. Where motors are run, the two circuits must be brought together.

There is no economical and convenient way of operating secondary distribution from this system. Two independent three-wire systems could be operated, but these must be brought together when motors are to run. The complication of balancing such a system would be prohibitory.

The two-phase, four-wire system can be operated either from a generator with two independent circuits, or all four conductors can lead from one armature winding. Certain advantages may be claimed for both methods, and both have disadvantages.

Fig. 4 shows a method of single-phase lighting distribution from a two-phase dynamo. Here the two single-phase leads are taken out at points 180 degrees apart on a progressive armature winding. At points ninety degrees from those leads two other leads are brought out; each of the latter can be used with the pair of single-phase leads to run one-half the capacity of the machine in two-phase motors. These two power leads cannot, however, be brought together.

The greatest disadvantage of this system is that when carrying a single-phase load a large pro-

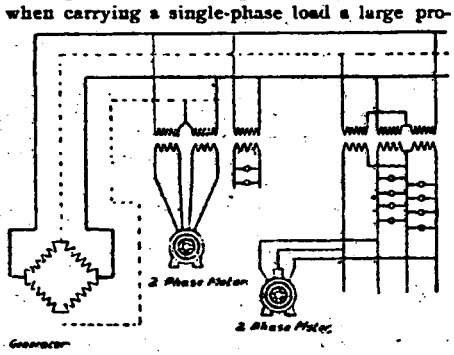


FIG. 4.

portion of the armature conductors are ineffective, and simply introduce useless resistance and self-induction in the circuit. Thus with the same loss the generator will deliver forty-two per cent more power as a quarter-phase machine than it will as a single-phase machine.

(To be continued.)

Polyphased Currents.

From many inquiries received it is evident that a wide misapprehension exists as to the nature of polyphased currents. In a letter before us, for instance, a correspondent asks for an explanation of the "flow of multiple currents in a wire," which phenomenon he frankly confesses is beyond his comprehension—and beyond that of anyone else, it may be added. The prevailing misapprehension on this subject is doubtless almost entirely due to the loose way in which those who know better speak of polyphased currents in the singular, and in their misapplication of the word "phase." The expression "a two-phase current," and references to a part of a polyphased circuit as "one of its phases," are constantly employed, to the very natural mystification of the uninitiated.

Polyphased currents are two or more separate and distinct currents not differing in any way from the current derived from an ordinary "single-phase" alternator. Their peculiarity lies not in the nature of the currents themselves, but in the fact that they have different strengths at a given instant of time. In the two-phased system, for instance, when one of the currents is at zero value, the other has its maximum value, or the currents are displaced *in phase*, whence the expression "two-phased." If two identical simple alternators have their armature shafts coupled in such a manner that when a given armature coil on one is directly under a field pole, the corresponding coil on the other is midway between two poles of its field, the two currents generated will differ in phase by a half-alternation and will be two-phased currents; similarly, three-phased currents could be generated by coupling the armatures of three simple alternators so that the corresponding coils on each are equally "staggered" with respect to each other. In point of fact, the above would be the ideal way of generating two and three-phased currents. When the two windings, in the case of the former, or the three windings, in the case of the latter, are combined on a single armature with a single field, compounding for differences in load cannot be applied unless the several circuits are equally loaded, since the proper amount of compounding for one circuit might be too great for the other. The two currents of the two-phased system have usually separate circuits, either of which is therefore a "single-phase" circuit in itself. When three wires are used, the third wire merely corresponds to the common return of a continuous current circuit. In the three-phased system it happens that the relative variation of the currents is such that each wire alternately acts as a "return" for the other two, so that there are three circuits with but three wires.

It is only at the receiving apparatus that the valuable properties of polyphased currents are developed. In a four-pole, two-phased motor, for instance, one pair of opposite poles supplied with one of the two currents has its maximum strength when the other pair, supplied with the other current, has no polarity. On the other hand the latter has then the greatest inducing power on the closed coil armature and the former the least. The consequence is that the second pair acts as the primary of a transformer, inducing in the closed coils of the armature a strong current; this current in passing under the first pair of poles develops a strong turning moment, exactly as in the case of a continuous current motor. In other words, while one-half of the field of a two-phased motor is acting as part of a transformer, of which the armature is the secondary, the other half of the field is acting on the armature current, thereby producing motion as in a continuous current motor. The action of a multipolar two-phased motor or of a three-phased motor may be similarly explained.—*American Electrician.*

A POSTAL TELEGRAPH

Bill Pending in Congress May Pass at the next Session.

There is a bill pending in Congress to establish a postal telegraph system. There is no likelihood of its passing in this session of Congress, but the subject is being quietly agitated, nevertheless, as it has been for years. Senator Butler, who introduced this bill, is hopeful of its passage in the next session of Congress. With the view to getting some fresh information on the subject, the Senate committee on postoffices and post roads invited a number of celebrated electricians to appear and give their views to the committee. In pursuance to this invitation, Patrick B. Delany of South Orange, N. J., the celebrated electrician and authority on such subjects, made a very interesting speech before the committee. It is his professional opinion that the postal telegraph can be established by the Government, and, contrary to some very able arguments presented, declares that the system can be maintained to the satisfaction of the public and at such a profit as to continue without annual appropriations by Congress.

He cites the operation of the British system as one of the arguments to show that postal telegraph can be maintained by the Government at a profit. He states that the earnings of the British system exceed the operating expenses. There is a deficit, but it is due to the large interest on the capital originally invested for the purchase of the telegraph. Had these lines been purchased by the Government at a fair price, the balances in the books would be on the right side.

Speaking of the report of the Postmaster-General of Great Britain for the year ending March, 1895, Mr. Delany said it was most favorable. It showed that the Government had transmitted 66,189,000 messages averaging fifteen words each, at an average cost of 15 cents, and in addition transmitted 5,004,000 press dispatches averaging 120 words each, at a cost of 9 cents each, or fourteen words to a cent. Furthermore, they transmitted 1,600,000 railway messages, averaging twenty-five words in length and representing 25 cents in value, free. He declared that had every message been paid for at regular rates and press dispatches paid for at a rate bearing the same proportion to the regular rate that such dispatches

are charged for in this country, the system would have shown a good profit. He added:

"No better evidence of the efficiency of the telegraph in England could be had than the fact that in the face of telephone competition the number of messages transmitted has increased at an extraordinary rate. In the city of London, even, the telegraph business has grown in spite of the telephone, while in this country telegraphy in cities has almost disappeared."

Mr. Delany then went on to give a history of the British postal telegraph system. He wound up by citing the condition of employes. He said that since 1891 their pay had been increased twice, while the pay of American telegraphers had in the same time been subjected to four reductions. Good behavior and diligence, he said, gave to the British telegrapher a life position from which no caprice or whim could drive him. Moreover he was finally pensioned. Continuing Mr. Delany said:

"I doubt very much whether telegraphy could be carried on any cheaper by the Government than it is now conducted by the companies, if the same methods of operation are to be retained. Expertness of the operator has reached its highest development. The use of the typewriter for printing messages, read from the sounder, has increased the speed of receiving considerably; but as the speed of the sending operator remains the same, the principal advantages of the typewriter lie in greater legibility, and owing to the margin of time gained, greater relaxation than by the use of the pen without an instant to spare. The era of hand telegraphy has long out-stayed its time, and to this fact may be ascribed the limited use of the telegraph by the public at large. Machine methods are as old as hand manipulation, but in this country they have not been used to any considerable extent, or their development taken advantage of. A wrong start has been adhered to persistently, owing, in a great measure, to over-construction of competing lines and multiplication of wires: and so long as one company gathered all the others in as fast as they came along, there were wires to spare, and therefore, as those in control argued, there was no use for increasing speed.

"With plenty of wires, no practical telegrapher will deny that a single short message can be sent by hand in the same time that it takes to perforate or prepare it for transmission by the machine system. The average layman is by this fact frequently deceived into grave error by not pushing the comparison further. If the message be a long one, or if there be a thousand messages to transmit, it might take two days to get these off by hand, whereas, if there are a sufficient number of perforators the whole lot could be transmitted in a few minutes. A perforating operator will prepare messages at the same rate of speed that a Morse operator can transmit them by hand, and a transcribing operator will typewrite them as rapidly as a sound-reading operator can receive, while the machine transmitter will send the dispatches as fast as from 70 to 170 perforators can prepare them, or afford on an average, according to length of circuit, the same carrying capacity as from 70 to 170 circuits worked by the present Morse system.

"At least one-half of the entire traffic of the British telegraph is carried by a machine system. Has any American traveling in the United Kingdom ever found the service slow? The average time of delivery for telegrams, from the time of filing, is about twenty minutes, and the blank informs the recipient of a dispatch the time of its filing at the place from which it came. In this country the companies do not dare to let the public know how long a message has been on the way. Each message shows the time of its reception, but there is nothing to indicate that it may have been a whole day in reaching its destination.

"Mr. Chairman," Mr. Delany continued, "without machine transmission, Government telegraphy, under the provisions of this or any other bill, would not be practicable, and the rates stipulated may be seriously questioned, on the basis of present hand methods of operation. In expressing this opinion I have no fear of contradiction from any disinterested telegrapher. I do not think that any government management could possibly conduct a telegraph service on a cheaper basis than it is now conducted, without the use of a machine system, concurrently with the increase of population and the desire for quicker facilities.

"With machine transmission," said Mr. Delany, "1,000 words per minute can be plainly recorded over a distance of 1,000 miles, or say, from New York to Chicago, and 2,500 words per minute can be plainly recorded from New York to Washington, and between other points throughout the country in the same ratio, according to distance. Last October, over an actual line (Philadelphia to Harrisburg and return) 216 miles, 940 words per minute were plainly recorded. This trial was conducted in the presence of a board of well-known electrical experts. With this system 8,000 words per minute have been recorded over an experimental line. This would be an impractical speed for regular work, as the transmitting tape must pass through the machine at the rate of 27 feet per second, or impulses recorded at the rate of 2,500 per second; but it goes to show the possibilities of the latest development in machine telegraphy."

On the assumption that the postal telegraph if instituted in this country, would receive one-fourth of the present letter telegraphic and telephone communication now going on between New York and Chicago, the establishment of such a system would, Mr. Delany argued, work to the profit of the Government.

Why National and International Unions

A question is pending in Brockton as to whether the Central Labor Union of that city will compel the local unions of bakers and barbers to either join the national unions of their trades or withdraw their delegates from that body, or whether it will surrender its charter from the American Federation of Labor.

One of the chief purposes of the Federation is to promote the formation of national and international unions. It has assisted in the inception of over a score of these bodies, and by its influence and coöperation has done much to build up many others.

To those versed in the doctrines of trade-unionism the reason for this is obvious, and no argument is necessary. Every plea for the formation of local unions applies to the formation of national unions—and many more. The prime purpose of trade-unionism is the regulation of hours and wages. Other things, however desirable, are but secondary.

The local union, alone, is of but limited efficiency in this respect, for the mobility of the labor market is such that an equilibrium between different sections is soon restored, however successful for the time being any one locality may be in regulating trade conditions.

It is true that an unaffiliated local union may profit by the work done on national lines by a national union, but its position is in no whit different from that of the non-union man who, getting the benefit of trade-union prices, shirks the duties and responsibilities of membership.

The same principle of coercion the local union applies to draft into unionism those who will not voluntarily enlist, may therefore properly be applied to local unions who likewise shirk their share of the expense of support of national unions. The logic of this proposition is unassailable.

The plea is sometimes made by individuals that they "do not like the way the union is run," and they object for this reason—oftentimes based on personal grounds—to joining the local. But the validity of these arguments is not granted by trade-unionists, who properly say, "If you don't like the way things are run, it is your duty to your craft to join the union and help run them better."

If the independent unions, so-called, have the welfare of their trade at heart, their place is inside the international, there to criticise, amend, or change affairs, as they see fit.

Every central labor union should do its part in this direction. To sustain locals in their refusal to join national unions is subversive of all discipline, helps to weaken trade-unionism, and is the very reverse of the policy which central labor unions—themselves made up almost wholly of branches of national unions—should maintain.—*Boston Labor Leader.*

The Cause of Poverty.

The masses are poor, ignorant and disorganized, not knowing the rights of mankind on the earth, and never knowing that the world belongs to its living population, because a small class in every country has taken possession of property and government, and makes laws for its own safety and the security of its plunder, educating the masses, generation after generation, into the belief that this condition is the natural order and the law of God.

By long training and submission, the people everywhere have come to regard the assumption of their rulers and owners as the law of right and common sense, and their own blind instincts, which tell them that all men ought to have a plenteous living on this rich planet, as the promptings of evil and disorder. The qualities we naturally dislike and fear in a man are those which insure success under our present social order, namely, shrewdness, hardness, adroitness, selfishness, the mind to take advantage of necessity, the will to trample on the weak in the canting name of progress and civilization. The qualities we love in a man send him to the poor-house—generosity, truth, truthfulness, friendliness, unselfishness, the desire to help, the heart to pity, the mind to refuse profit from a neighbor's loss or weakness, the defense of the weak. Our present civilization is organized injustice and intellectual barbarism. Our progress is a march to a precipice. The Sermon on the Mount and natural justice can rule the world, or they cannot. If they can, our present ruling is the invention of the devil; if they cannot, the devil has a right to rule—if the people let him—but he ought not to call his rule Christian civilization.—*John Boyle O'Reilly.*

How They Do It In New Zealand.

In three years the people in New Zealand enacted the following reforms: Government ownership of railways, telegraphs, telephones and insurance; graduated income tax; exemption of homes from taxation; discouragement of alien ownership of land by levying an absentee tax; restoration of the land held for speculative purposes to the people by a heavy graduated land tax, * * *. Besides the hours of labor have been reduced to a minimum and a maximum rate of wages has been fixed for the Government employes, a splendid system of factory inspection has been introduced, the contract system has been practically abolished, and many municipal reforms have also been introduced. * * * New Zealand, according to consular reports and reliable Australian newspapers, is to-day the most prosperous, contented and happy little country under the starry heavens. There are few paupers and no monopolies; there is a gratifying decrease in drunkenness, prostitution and crime, and the usurious practices of a few years ago have been discontinued.

If the Government owned the telegraph system of the country there would not be $100,000,000 watered stock drawing dividends.

THE ELECTRICAL WORKER

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St. Louis, Mo., June, 1896.

W. N. GATES, SPECIAL ADVERTISING AGENT,
29 Euclid Avenue. CLEVELAND, OHIO.

HENRY WHITE, General Secretary of the United Garment Workers of America, has an excellent article in the *Bulletin of the Department of Labor* for May, on the sweating system.

THE Department of Labor, in conjunction with the Bureau of Labor Statistics in the various States, will make an investigation as to the economy of municipal ownership of gas and electric light plants. Every gas and electric light plant in the United States which is owned by the municipality, will be reported upon, and also a sufficient number of private plants to afford a basis of comparison between the two classes.

DR. W. W. JACQUES, of Boston, claims to have invented a method of generating electrical energy direct from carbon, without recourse to steam or other mechanical power. The method, in brief, is as follows: An iron pot, forming one of the electrodes, contains caustic potash as an electrolyte, kept in a state of fusion by a furnace. The other electrode is a carbon rod partly immersed in the electrolyte. The office of the electrolyte is simply to convey the oxygen of the air to the carbon electrode, and in order to keep up a constant supply of this oxygen, a tube is inserted in the electrolyte through which atmospheric air is pumped.

LAST winter a few of the "labor dupes" or "labor skates" in Chicago invited John G. Carlisle to lecture before the workingmen on the currency question. The speech was delivered in the Auditorium on April 15th, by *citizen* Carlisle. This speech was afterwards ordered printed and sent out from Washington as a privileged document at Government expense, or rather at the expense of the people, as a campaign document. During the last month we have received several hundred copies from different members of Congress, enclosed in envelopes such as are regularly used by members of Congress for sending out speeches delivered in Congress. We presume all the other labor officers and members have received like copies, and probably millions will be distributed, adding thereby to our postal deficiency.

THE socialists of Milwaukee, by the hearty support they have given to the striking street railway men and electrical workers, have closed the breach that existed between the labor forces in that city, and organized labor for once in its history presents a solid front against the encroachment of monopoly. Victor L. Berger, editor of the "*Wisconsin Vorwaerts*," and his collegues on the socialistic and German press have spared neither time nor expense to aid the strikers. The English press, however, with the exception of the *News* and *Record*, are on the side of monopoly. The *Sentinel* is owned by the Street Railway Co., and is the official organ of that monopoiy, and as it is the only English daily morning paper in the city, papers in other cities are misled by the *Sentinel* into publishing all kinds of fakes about the strike. As the *Sentinel* is a rat sheet, even though it were not controlled by the Street Railway Co., nothing fair could be expected from it. The *Evening Wisconsin* and the *Journal* are also monopoly controlled sheets and serve their masters faithfully.

WILLIAM E. WEIDENBECK, a lineman working for the Fort Wayne Electric Light Co., Des Moines, Ia., was almost instantly killed on June 6th by coming in contact with a live wire. He was working on a pole connecting a transformer, and accidentally came in contact with a guy wire extending from the crossarm to an adjacent pole. On the second pole there was a ground wire extending from top to bottom, and in contact with the guy wire, thus forming a "dead ground" from the pole on which Weidenbeck was working about one hundred and fifty feet distant. He was thrown to the ground, thirty-five feet below, and died in a few minutes. His hands were badly burned, proving that the fall was due to a shock and not to mere accident, as the company tried to make out. Weidenbeck was a good member of old No. 55, and tried hard last winter to reorganize the Union, but men who are risking their lives daily for $2.00 per day could not see the benefit of a Union, and his efforts failed.

The Milwaukee Strike.

The Milwaukee street railway strike and subsequent boycott stands unique in the history of American labor difficulties. Five weeks ago, Henry C. Payne, better known as "Hypnotizer" Payne, refused to meet a committee of his employes representing Division No. 15 of the Amalgamated Association of Street Railway Employes. A strike followed and then King Boycott made his appearance. Who introduced Mr. Boycott no one seemed to know. *Venit, vidit, vicit*, at least the pocket-book of the street railway syndicate, and gave Payne a great pain.

The origin of the present difficulty dates back several years. In the old days of horse-cars, Milwaukee, like all other large cities, had a number of independent railway companies. With the introduction of electricity, consolidation, over-capitalization and stock jobbing began, and in this the fine Italian hand of Henry C. Payne was very much in evidence. Mr. Payne has been a lobbyist for years and is a past master in the art of manipulating city councils and State legislatures. It was this work that gave him the name of "Hypnotizer" Payne. The street railway plant of Milwaukee, although a very good one, could be easily duplicated for $2,000,000. Payne, Villard and other speculators who wrecked the Northern Pacific thought they saw a chance for more dupes in Milwaukee and after capitalizing the street railway company for eight millions, which by the way is chartered under the laws of the State of New Jersey, threw the property into the hands of a receiver, knowing full well with their friend Judge Jenkins on the bench Mr. Payne would be appointed receiver and there would be a good chance to freeze out the small stockholders. Mr. Payne, while acting as receiver, was also appointed one of the receivers for the Northern Pacific and has recently been allowed $81,000 for that service, which consisted in a ride over the road and a trip to Europe, ostensibly for the good of his health, but in reality to allow some of the indignation, caused by his management, to die out. About three months ago the road was taken out of the hands of a receiver, but Mr. Payne as Vice-President was left in control. He brought to his aid Mr. Weyman, who said he had licked the Irish in New York and would lick the "Dutch" in Milwaukee should they offer any opposition to his management.

Two years ago the employes of the road made a demand for 20 cents an hour. A compromise was effected at 19 cents with

a promise that 20 cents would be given as soon as business revived. About a year ago the company instead of advancing the wages as agreed, tried to reduce them, but met with such an opposition that the attempt was abandoned. In April the employes were convinced that the railway company intended to ignore their union entirely, break it up if possible, and then with its millions treat with each individual employe, which meant a return to the conditions that existed among street railway men some years ago when they worked from fourteen to sixteen hours at whatever wages the companies chose to offer. The union drew up a statement of the grievances against the company and asked for a conference with a view to signing a contract for one year with the company. The demands of the men, which they were willing to submit to arbitration, were very moderate. They asked for a workday of ten hours at 20 cents per hour; that they have the privilege of purchasing uniforms in the open market, so long as they conformed with the requirements of the company, and not be compelled to pay exorbitant prices to the company's tailor; that the runs be more evenly divided between the day and night men; that a man who lost his regular run on account of operating salt car or sweepers should receive a full day's pay; and lastly that the company receive a committee of the employes at any time to hear any grievance the men may have, and in case it could not thus be settled by a conference, to have the grievance submitted to arbitration. The company refused to accede to these demands, but on Saturday, May 2d, promised to confer with the men on Monday. On Sunday, however, the men discovered that the company was preparing to turn its barns into boarding-houses and had men in St. Paul, Minneapolis, and other cities employing new men, and had also brought a number of colored cooks from Chicago and had placed cots and supplies in all the car barns. On discovering this, the men demanded a conference with Mr. Payne before one o'clock Monday morning. This was refused, and as it was evident the company was preparing to lock out their men on Monday morning, at one o'clock Sunday night a strike was ordered by unanimous vote of the union, which had about 1,000 members.

On Monday night there was a meeting of the Federated Trades Council, which either requested or ordered the electrical workers employed by the street car company to go out also. On the same evening a meeting of No. 2 was also held and when the delegates to the Federated Trades Council made their report the question whether the electrical workers should go out, or not, was discussed for about four hours. The electrical workers, about thirty in number, working for the street railway company, made the stand that it was not fair for them to go out unless all the electrical workers went out, and in order not to break faith with the street railway employes and the Federated Trades Council, by a unanimous vote No. 2 decided to go out in a body. J. T. Kelly, Grand Secretary, was telegraphed for on Monday but did not arrive in the city until Tuesday afternoon which was too late for him to give any advice on the action taken the previous night.

On Wednesday a special meeting of the common council was called and a committee of five appointed to confer with a like committee from the merchants and manufacturers' association, with a view of settling the strike. These committees held a number of sessions and heard the grievance of the men and also the company's side of the story, but when they made their final report about midnight Friday night, nothing was accomplished. On Saturday the State Board of Arbitration was called in and several more conferences were held with the same result, as the company maintained, like Geo. M. Pullman, that it had nothing to arbitrate. A committee of prominent Republicans next took up the matter as they feared from the fact that Mr. Henry Payne was a National Republican Committeeman and the man to whom every Republican politician, from the Governor down, looked to for election, that the prospects of the party in the State would be injured at the election next fall, just as the Republican party was defeated four years ago by the Homestead strike. Mr. Payne told them that he had "made" them and politely showed them the door. Two prominent business men, Messrs. Hannafin and Morgan next undertook to settle the strike. They succeeded in getting the officers of the company and the leaders of the strike together. This was the first meeting of the parties directly interested since the strike started. Mr. Payne proved as stubborn as ever and no settlement could be reached. Mr. Samuel Gompers, President of the A. F. of L. was then telegraphed for and arrived in Milwaukee on May 28th. Another conference was held at which Governor Upman was present, but it was the same old story—nothing to arbitrate. And thus matters rest.

While the conferences were going on, the citizens of Milwaukee and the strikers were not idle. Several mass meetings were held each night in different sections of the city, endorsing the position of the strikers and encouraging them to hold out. All the labor and secret societies of the city held meetings pledging financial support, and in most cases passing resolutions fining members $10.00 for riding on the cars. The City Council passed resolutions revoking franchises of the company and the question of municipal ownership of street railways was discussed both in the City Council and at public meetings, and the socialists of Milwaukee were accordingly happy. The strikers organized bus lines and secured horses and busses from all the surrounding towns, bringing a number even from Chicago. It is a strange sight to see cumbersome busses and vehicles of all kinds loaded with passengers, while the cars pass up and down the streets empty. This has been kept up now for over five weeks, and the people are yet riding in busses or walking, and will continue to do so until the strike is settled, if it takes all summer. The company is losing thousands of dollars in the loss of fares, not to speak of its loss through the incompetent men who are handling its cars and the army of Pinkertons it has brought to Milwaukee.

On the day the strike started, the company had men ready to take out cars, although the first day few cars were run. Nearly all the men at first put on the cars were in the employment of the Thiel Detective Agency, and were armed and sworn in as deputy sheriffs, notwithstanding the fact that there is a law in Wisconsin against such importation, and disqualifying any person from being a deputy sheriff or a police officer unless he is a citizen of the State. Chief Jansen and Sheriff Stanley were willing, however, to violate this law or do anything to aid the monopoly that had so often aided them in their political aspirations. New men were gradually secured from the slums of New York, Chicago and other large cities and placed in the car barns like a lot of cattle, where they have been kept for five weeks without probably washing their faces in all that time, not to speak of taking a bath. They sleep in the cars at night, and yet these are the cars that a few sympathizers of the company who held a gag meeting at the Merchants' Exchange, censured the people for not riding in, and declared that a reign of terror existed in Milwaukee, simply because, by almost unanimous consent, the citizens had boycotted the street railway company, and would not ride in the cars. The lot of a scab is not a happy one unless his nature finds happiness in being jeered, hooted at, hit by ancient eggs and missiles of all descriptions; ignored and despised, so that he could not buy a glass of beer or get a shave in the city, and even the company, whose interest he was serving by taking the bread out of the mouths of honest people, could not purchase any provisions in Milwaukee, and had to send to Chicago for grub for its scabs. A day of reckoning will come, however long it may be delayed; when Mr. Scab will be forced out of Milwakee, but by that time there will probably be some difficulty in another city where he can ply his nefarious vocation. Some of the scabs now in Milwaukee were in Brooklyn during the strike in that city, and later on in Philadelphia, and will probably turn up again in some other city should a strike occur.

As stated before, the electrical workers went out in a body to aid the street car men. After being out for ten days, it was apparent that the strike would be of long duration and would be a question of endurance as to which could hold out the longer,

the strikers with the citizens of Milwaukee almost as a unit at their back, or the street car company with a spectre of municipal railways or an opposition company staring it in the face. Accordingly, at a meeting of No. 2, it was decided that more good could be accomplished by allowing the inside men and others who were working for friendly companies to go to work, and for a committee to visit the large business houses and places where current was used and induce them to throw out the Edison service and take current from a friendly company. The monopoly plants consist of the Edison power-house, the Badger Electric Co. and the Milwaukee Arc Light and Power Co., which, together with the street railway system, constituted the Milwaukee Electric Railroad and Lighting Co. The only independent plant is the Pabst Heat, Light and Power Co. This is a new plant and was prepared to furnish first-class service. When, therefore, a committee from the Union called on the business houses, they found all ready and willing to use the Pabst service as soon as connection could be made. This means a permanent loss of thousands of dollars a year to the monopoly. The monopoly seems to have a hand in almost everything electrical in Milwaukee, not even excepting the telephone, as Mr. Payne is also President of that company. At first it was not intended to have the fight spread to the telephone company, but from the close connection between the telephone company and the street street railway company it was unavoidable, and had the men returned to work for the telephone company when they did for the friendly companies, it would be certain that they would be asked to put up wires for the street railway company and bring on a fight, as the men would refuse to do anything to aid the street car company, even to putting in a telephone. Shortly after the strike started, Mr. McCloud, general manager of the telephone company, went off on a fishing trip and remained away for several weeks. Consequently it was impossible to see him and have an understanding in regard to the men returning to work and what would be expected of them, and as a result, the telephone men are still out.

No. 2 has at present 100 men out. These consist of telephone men, the employes of the Badger Electric Co., the Milwaukee Arc Light and Power Co., and the linemen, dynamo tenders and repairers of the street car company. Although the strike has been on for five weeks there has not been a desertion from the ranks of either organization of a single member who was in good standing when the strike started.

Members should be impressed with the necessity of calling for union labels, working cards and badges.

Boycotts should not be levied unless there is a good possibility of success. The same is true of strikes.

FROM OUR UNIONS.

ST. LOUIS, MO.

Editor Electrical Worker:

I cannot plead this month that I have nothing to write about, but on the contrary so much has occurred that my excuse must be I have not time to write. The tornado which devastated a large section of our city on May 27th, and wrought such havoc with our overhead system of wires, has left little time to write or think.

Electrical workers have flocked to St. Louis from all sections of the country, and while up to the present there has been work for all, I would advise those who contemplate coming this way to give St. Louis a wide berth, as in a short time our streets will be crowded with idle men.

Union No. 1 has been experiencing a steady, healthy, growth, and is rapidly forging to its rightful position as leading Union of the Brotherhood, which proud honor it lost several years ago through the treachery and indifference of some of its members. We have now practically all the inside men in the Union and I hope soon to announce that we will have all the linemen also. Last night we held an open meeting which was well attended and fifty new applications received. These, however, were mostly from men who came to the city since the storm and was the result of a week's work of our business agent who was instructed at our previous meeting to make a canvass of the new men and bring in the applications of all who were worthy of membership in our organization. During the next week, he will probably bring in 100 additional applications. It is true a large proportion of these men are only temporarily in the city, but when they go away they will go away as Union men and will no doubt help either to organize new Unions or build up old Unions wherever they go. At our meeting there was a large number present with cards from other Unions, but I am sorry to say there was also a large number present who were in arrears in other cities. If they stay here very long we will try and have them settle their arrearages and get traveling cards. It was a pleasant surprise for some of our hard workers who have stood by the Union through thick and thin and often sat in the hall when barely a quorum was present, to see our hall last night crowded to the door, with the ante-room filled and some even standing on the stairway.

Bro. Chas. Botsford, while working on a pole at the corner of Fourth and Valentine streets was severely shocked and burnt a few days ago. He is around again but it will be some time before he is able to work.

John Sullivan, one of the new employes of the Missouri Electric Light & Power Co. was killed last Monday in the basement of a saloon at Eleventh and Morgan streets while repairing some wires. I do not know the particulars of the accident but am informed that he was one of the new men who thought he could do electrical work and took advantage of the demand for men caused by the storm.

A MEMBER OF NO. 1.

SAN FRANCISCO, CAL.

Editor Electrical Worker:

I will open the switch once more, but suppose I will burn low, as I have been out of the city for the past ten days attending the Foresters' Convention, held at Watsonville. I learned while there that the 'Phone was putting in an exchange of thirty-five subscribers, using the party-line system of five subscribers on each line at the rate of $1.50 per month. We can all have 'phones in the "sweet bye and bye."

Our ex-secretary and ex-brother, Chas. Hogan, opened up a domestic exchange a few days ago. Good luck, Charles. When you get a new subscriber, we will celebrate.

I had a letter from Bro. Little a few days ago. He was in Salt Lake City and doing well. Regards to and from all the boys.

Well, our second annual picnic takes place June 7th. Prospects are good for a grand success.

Bros. Frost and Cameron are not tearing all the poles to pieces on the San Bruno road, so the rest of us will have a show this year.

We, of No. 6, are trying to open a library and reading room. Our plan is, if successful, to have a permanent place to meet, have a library and reading room to be open at all times to our local and visiting members. Also have a register so when a member comes along looking for work, he can register his name, where from, and his present address. Then when any of the companies want any men, we can tell at once whether we can supply them or not. We would like to know how many Locals have established libraries and reading rooms and how successful they are. Let us hear from all through the WORKER.

Our fifth Grand Vice-President, Bro. Irwin, installed a new plant in Sacramento a short time since, with about fifteen lights, and more to put in. Do not know the Local's number, so will say success Sacramento. C. E. MASTEN, *Press Secretary.*

SPRINGFIELD, MASS.

Editor Electrical Worker:

After neglecting my duties as Press Secretary for the past three months, I will now endeavor to let the Brotherhood know that we are still in existence, and I am pleased to say, in a very healthy condition. We have added several new members of late and now have nearly all of the electrical workers in the city started in the right direction. That is all that amounts to anything.

Work is not very brisk here now, but most of the Union men are getting in their time, for which we are duly grateful.

A young man, Wm. Hayes by name, was killed by electricity in the station of the United Electric Light Co. last month. No one seems to know just how, but in some way, while changing the circuits on the arc switchboard. The manager of the company came out with nearly a column in one of our daily papers telling how his death must have been caused by carelessness or a desire to show off his knowledge of the board to his fellow workmen, but I have heard from other sources that the accident may have been caused by defective insulation on the cables. Also that he was not any too far advanced in electrical knowledge. He was not a member of the Brotherhood.

One of our members, J. Cashin, had a cancer removed from his lip three weeks since, and is now all O. K. He was in good standing with the Union and received his benefit while under the weather; and when a poor workman is sick and not working, four dollars a week comes in very handy, and brings to a person's mind one of the many benefits to be derived from belonging to our Brotherhood. We all congratulate Bro. Cashin on his recovery.

Now, as we are all looking for the good of our cause, if no one objects to hearing me rave, I would like to unfold a scheme whereby I think we might strike a good blow for the Union. Could we not make arrangements with the insurance companies' exchanges to accept notices of all work done in their locality from a board of inspectors appointed by the Local. For example: supposing No. 7 were to appoint three men here in Springfield, one from each of the three principal contractors, to inspect all the work done in this city and report any defects in same to the New England Insurance Exchange. That would insure good work being done, and as it takes good workmen to do good work, we could drive a great many of the scabs and dubs out of the business. As it is now the inspector from the exchange does not know of all the work done, as a great deal of it is never reported, and by such an arrangement we could make the contractors see the advantage of employing Union men. I know the above is a very crude explanation of my idea, but I would like to hear from some of the brothers on the subject. Of course I do not want any of them to jump on me and crush me, but if I am foolish break it to me gently.

Well, I must break the circuit, as I do not want this letter crowded out of the June number, as the boys engaged a rope last month when they found no letter from Springfield.

H. B. RUST, *Press Secretary.*

TOLEDO, O.

Editor Electrical Worker:

I was elected to fill the position of Press Secretary, and as this is all new business to me, you will please be lenient toward me until I get all the circuits down "pat."

Our last Press Secretary, Bro. Crowley, was elected President, and he makes a good one. Pete is a jolly, good fellow, and is well liked by all the boys.

Our meetings are fairly attended, but there are lots of the boys who could come, but who only show up to pay their dues when they fall due. If any of the brothers who read this letter could give us some plan or good advice about how to get the boys to attend the meetings more regularly, it will be cheerfully received by the boys of No. 8. Talking to them doesn't seem to do any good.

There is some work going on here at present. The Central Union Telephone Co. has a big gang at work for some time. The Traction Co. is doing some rebuilding, also the Harrison Telephone Co., but they don't amount to much. The work they are doing is very cheap, also their wages; they are paying $2.00 a day and the other companies, $2.25 a day.

Some of our boys are leaving town, and we wish them good success. We would like to hear from Bros. Faust and Sherman Abel. Bros. Frank Neff and Chas. Tyner have transferred their cards to No. 10.

We had the sad misfortune to lose one of our brothers. Bro. Henry Stoddard was caught by an alternating current and thrown to the ground, a distance of forty feet, striking a water plug with his back. He lived four hours after the accident. He will be sadly missed by all the boys, as all those who knew him were his friends.

Bro. Jack Pierson has the two steps that the wires were laying on when he was caught. They plainly show the marks of his fingers. Bro. Jim Burns had his arm caught between a running-board and a cross-arm to-day. There are no bones broken, but it is badly mashed up, and it will be some time before he will again be able to grip the pliers.

A lineman by the name of Bunn Hogan, stole Bro. Burns' spurs. It was a mean, contemptible trick, but he is not above doing such tricks. If he should happen to strike a town where any of the brothers are, treat him as he ought to be treated. He is too far gone to make anything out of him. If he should happen to read this article, it will be a forewarning to him to steer clear of Toledo in his future travels.

No. 8 was asked to affiliate with the Central Labor Union, but we did not deem it advisable or beneficial at present, so we put it off until some future day.

Bro. John Bramsch, our genial Financial Secretary, has gone into the chicken business. We will expect to see feathers fly when John gets into a debate after this. If all the members were as active as John, there wouldn't be a Union in the country that could touch us.

We are adding new lights right along, and more new names proposed last meeting night. Bro. Alex. Emmanuel, of Detroit, Mich., was the last one to ride the goat. JACK.

IN MEMORIAM.

WHEREAS, It has pleased God in His most infinite wisdom to call from our midst our friend and brother, Henry Stoddard, and

WHEREAS, The members of Local Union No. 8 feel that they have received an irreparable loss, therefore be it

Resolved, That we tender our heartfelt sympathy to the bereaved family in this hour of affliction. And be it further

Resolved, That a copy of these resolutions be sent to the family and also be published in the official journal and also that the charter be draped in mourning for thirty days.

PETER CROWLEY, *President.*
W. H. STARK,
J. A. COONEY,
JAS. BURNS,
Committee.

CHICAGO, ILL.

Editor Electrical Worker:

On Thursday evening, April 30th, one of our most worthy brothers, Peter McDonald (whose picture appears in this issue), was run down and almost instantly killed by an electric car on South Chicago avenue. He left his home early in the evening on his bicycle going over to Fifty-fifth and Wallace to intercede with the Superintendent of the People's Light & Power Co. in behalf of the Union boys who were on a strike at the Coliseum, and after completing his mission was on his way home when the fatal accident occurred. Being taken wholly unawares by the car, he was thrown from his wheel and dragged nearly one hundred feet before the car was stopped. It is quite probable that the conductor and motorman were both inside of the car, and as stops are seldom made at this portion of the run were paying little attention to their car. As soon as possible, Bro. McDonald was taken from under the car but was left lying on the ground until the second car came up, when people who knew him volunteered their services and he was taken up and carried about six blocks to a drug store, where he died in ten minutes, in all about forty minutes from the time he was struck by the car, he having lain on the ground for from twenty to thirty minutes entirely uncared for, while the people who were to blame for his death stood by and watched him die, without attempting to summon or assist him to medical aid in any way, he helplessly begging them to take him home so he could see his wife before he died.

Bro. McDonald was 29 years old and born in Nova Scotia. He came to the States while young and entered the electrical field, where he steadily arose on the ladder of fame until he was well up in his profession. He worked for the Denver Consolidated for five years, both as a lineman and foreman, and left as a steadfast friend of all who knew him. Nearly three years ago he accepted the position of Superintendent for the Calumet Electric Light & Gas Co., of South Chicago, which he has loyally filled up to the time of his death. He was liberal to a fault, his whole ambition being to give first and give most.

He was a Union man from the ground up, always employed Union men and was seldom without an N. B. E. W. button on his coat. He was a charter member of No. 9, where he was an ever-faithful worker for the cause. Only a short time ago he was one of those instrumental in organizing No. 19, the trimmers and wiremen's Union that Chicago has needed so long.

Bro. McDonald was killed at 11:20 Thursday evening and was expected to be buried on Sunday, but owing to the fact that the priest refused to say mass for him on that day it became necessary for the funeral to be Saturday at 8 A. M., thereby disappointing hosts of friends. He leaves a nearly distracted wife of ten months and thousands of friends to mourn his death. He had no insurance except $100 with the Union and $100 with the K. of P.

The following is a copy of the resolutions adopted by No. 9:

BRO. PETER MCDONALD.

WHEREAS, Our order has sustained a grievous loss in the death of our beloved brother, Peter McDonald, therefore be it

Resolved, That we pay tribute in these lines to the memory of our departed brother as an exemplary character worthy of the fullest confidence of all who love truth, honor and justice: and that we point to his example as one where death was not as life had been lived—bravely;

Resolved, That as an order we most humbly bow submissive to the will of an all wise God;

Resolved, That as a token of respect our council hall be draped in mourning for a period of thirty days;

Resolved, That we deeply sympathize with his sorely afflicted family from whom has gone the fond and tender husband, the kind, affectionate brother, the loyal, steadfast friend; and we would express the hope that all may finally meet him in that Grand Council eternal in the heavens;

Resolved, That a copy of these resolutions be spread on the minutes of the meeting of Union No. 9, a copy be sent to the family of deceased, and also that a copy be sent to the ELECTRICAL WORKER for publication.

C. E. BOGAN,
W. A. JACKSON,
W. H. GILMARTIN,
Committee on Resolutions.

DETROIT, MICH.

Editor Electrical Worker:

No. 17 sends a hearty greeting to all sister Locals, from New York to San Francisco, and to yourself as well.

The Light & Power Co. had trouble with five of its men, and they are "walking the street." Hugh Fitzgerald, the manager's brother, and Chas. Ford, both foremen, are two of the number, but as they "scabbed" during the strike which our Union won against the company, No. 17 will not shed any tears over them.

At our last meeting a boycott was declared against Vanderbeck, the manager of the Detroit team of the Western League of base-ball, and any member who attends till the matter is settled, will be fined $5.00 or expelled. The Trades Councils of the following cities have been notified, as they are Western League cities: Grand Rapids, Milwaukee, Columbus, Indinapolis, St. Paul, Minneapolis, Kansas City, Detroit. Little Vanderbeck told the committee they could just go ahead and "do their damndest." Let us do so, and the size of his head will be reduced somewhat or we are much mistaken. The delegates to the Trades Councils of the above cities will get particulars of the trouble to report to their Unions.

Jimmie Runkel, who was initiated away down in Texas a couple of years ago, and drifted north to Michigan, was elected President of our Union, but, as he is such a good hustler on committee work, he is always on demand in the committee room. So he resigned in favor of Vice-President Thos. Forbes, who strictly lays down the rules according to the constitution and by-laws, and as he is six feet four inches in his stockings, his word has weight.

Bro. Robert Phillips is out of bed, after being laid up for a long time from a fall from a pole. The lighting commissioners paid him his wages right along, and he would not take any sick benefit from the Union. That is what I call unionism and patrotism combined.

Bro. F. Klein, who was hurt, also turned four weeks' benefits back into the treasury. He is Union from the ground up, too, even if he does fly off the handle in an argument sometimes.

Electrical workers in the employ of the Police Commission have been granted an eight-hour day and a raise of pay from $2.00 to $2.20 through the efforts of No. 17.

If any of the traveling brothers are in our city on our meeting nights, we would be pleased to have them come up and visit us; but, they must have their traveling cards and the quarterly pass-word, or they will not be able to pass our Foreman, Bro. M. Conine, who understands his business, and is a hustler from away back.

DANIEL E. ELLSWORTH, *Press Sec'y.*

CHICAGO, ILL.

Editor Electrical Worker:

Scarce ever more sadly could No. 19 send her "bit" to the Journal than this time, for the loss of her true friend makes the past month a dark one. Bro. Peter McDonald went to his long home a month ago, and no more is his ever ready assistance available. As he was returning along South Chicago avenue in the evening on his wheel, he was overtaken by a motor car, and died in half an hour. He was a member of No. 9. Many of No. 19's members accompanied the funeral and the following resolutions were passed at our next meeting:

IN MEMORIAM.

WHEREAS, On April 30th Bro. P. McDonald, of Local Union No. 9, was run down by an electric car while on his way home and overtaken by death, and

WHEREAS, Local Union No. 19 loses in him a true friend,

Resolved, That the members of Local No. 19 extend to the relatives of our departed brother their heartfelt sympathy in their present bereavement, and that a copy of this resolution be sent to our brother's widow, to our official Journal, and be spread on our record.

Would there were more who created an interest outside of their own Union. Our lost brother's successor is like him in name (McDonald), and we hope may prove not unlike him in nature. He is brother to the superintendent of the company.

Our by-law committee have received copies of by-laws from Unions Nos. 1, 2, 9, 17, 27, 35 and 43, and letters from Nos. 5, 26, 57, 62, 67 and 70, saying they also were preparing by-laws. Bro. McFarlane, of Los Angeles, writing from Missouri, is making for this city; hopes his Union will be able to furnish us, and means to show up when he gets here. Five letters were not delivered, and I would ask that a decent respect for us suffering secretaries may cause Nos. 30, 41, 53, 56 and 63 to declare their correct addresses to the editor. Three report as no more and our committee is still waiting for the card that is up the sleeve of the other fifty-seven Unions. Please send.

The city trimmers are careful, and they are right. A Union's record should speak and it has been hinted to me a set of by-laws should declare a purpose. Our charter is not yet reopened.

D. PEARCE, *Press Secretary.*

LOUISVILLE, KY.

Editor Electrical Worker:

As our Press Secretary is not in town, I have been asked to take his place and do the best I can.

Work has been slack here for some time, and it has been hard to get the boys to attend the meetings. We have hit upon a scheme, however, by which we expect to bring the last one of them up next meeting night. Refreshments! Well, a word to the wise is sufficient.

After to-night we will have a new electric light inspector, and it is to be hoped that he will see to it that all the "bum" work around town is torn out and reinstalled. There is enough such work in town to give all electrical workers employment for some time to come.

Bro. C. D. Hatt, yours of April is all O. K. Come again. EDW. HERPS.

PROVIDENCE, R. I.

Editor Electrical Worker:

As my work is keeping me out of the city of late, I do not seem to get much time to write. That is the reason you did not get my letter last month. I hope the brothers will pardon me for letting one month slip by, and I will try and keep my space filled in the future.

I received your communication and was about to answer, but as I know you have heard from Local No. 39, you understand thoroughly the condition in which we stand. We are about to offer big inducements to the electrical workers of Providence, and if they do not take advantage of them this time I am afraid Local No. 39 will be a thing of the past. Providence never was a Union town, and I am afraid never will be. Unionism among tradesmen in this city is a thing thought very little of among the tradesmen. They will join a Union, pay a few months' dues, and if they do not draw out two dollars for every one they put in they get dissatisfied and fall by the wayside. They will then say "the Union is no good."

Bro. Colvin, our New England Organganizer, was here at our last meeting. He proved himself a gentleman fully capable of holding the office which he fills, but I am sorry to say the audience he had to address would stagger a goat. There were about twelve in the hall. I sometimes think they expect to get a shock. We have an electric bell on the hall door for the benefit of members who come in late. On that bell loop we run 40,000 volts. I think if we split that circuit up in about 10,000 pieces, some of our brave brothers would have courage enough to press the button and enter.

Business in the city is about the same. The Postal Telegraph Co. has completed its new line on South Main street.

The Western Union Telegraph Co. has about the same number of men. The Providence Telephone Co. has hired a few new men this spring. The company will give its subscribers a first-class service this summer. They are throwing out all of the grounded lines, and also the specials. They will be replaced with metallic circuits. They are also placing their wires underground at Narragansett Pier.

Bro. Jas. McNeill, who has been in the employ of this company for a number of years, has been appointed foreman. James entered upon his new duties about a month ago, and he is giving the best of satisfaction. His gang is at the Pier just now. Jim says he will place that line in shape or bust.

D. J. SPELLMAN, *Press Secretary.*

PHILADELPHIA, PA.

Editor Electrical Worker:

Thursday evening, May 7th, our Local gave a reception and smoker to the members and their friends, which was a brilliant success as an entertainment.

Proceedings were opened by a short address from our President, Bro. Neal, who then introduced Mr. P. J. McGuire, Gen'l Secretary of the Carpenters' Brotherhood and 1st Vice-President of the Federation of Labor, who delivered an eloquent address which was listened to with great interest, after which the following programme was gone through:

Selections by an orchestra of seven pieces, composed of the brothers of No. 41; piano solo, Mr. Chas. Page; songs and recitations, Mr. Ed. Jewell; violin solo, Prof. Hyatt; address, Mr. John Boles (Sec'y Cigarmakers' Union); songs, Mr. M. Charlton; dance, Mr. Sommerly; banjo and mandolin, Bro. Kutch and Mr. Sawyer; song, Mr. Arnold; recitation, Mr. Downs; songs, Mr. Alberts; address, "Capital and Labor," Bro. D. Griffin; songs, Mr. Line.

During the evening Bro. Donaldson rendered "The Lakes of Killarney" in a rich bass voice with fine effect, accompanied by Bro. Murray on the piano and Bro. Moreland on violin.

Quartette consisting of Bros. Gleason, Donaldson, Griffin and Neal sang the latest popular songs to repeated encores.

Bro. Gleason gave a song and dance accompanied by Bro. Wm. Charlton.

The inner man was now taken care of in a very efficient manner by Bros. Francks, Locker, Lieber and Maybrey, and also by the committee in charge of the smoker, who spared neither pains or labor to make it the brilliant success which our visitors pronounced it to be.

I had nearly forgotten Bro. Smith, who favored us with a few fine vocal solos, accompanied by Bro. Thayer on violin and Bro. Staats on the piano.

Hoping to soon have another occasion of the same kind to report, I close with the thanks of the members to the committee on smoker.

F. ASHDALE, *Press Secretary.*

ROCHESTER, N. Y.

Editor Electrical Worker:

We are not having any great amount of work to do, but on the contrary, it has been very slack in Rochester for the last three or four months, and the future is not bright, so I would advise any brother looking for work to give some other city a call first, but I hope that the old saying will prove true in our case, that there is always a calm before a storm.

Bro. Peter Martin had a sad accident happen him about six weeks ago. He was doing some work on a pole when the pole broke and he came down with it and broke one of his legs and hurt the other badly, and I think it will be a long time before he will be able to work again. I am glad to say at the present writing all the rest are well.

Some of our brothers think that Bro. M. Fox made a bad move by forming a partnership with one of Rochester's fairest maidens; but I don't think so, for the best friend I have in this world is my wife, and I hope Bro. Fox will think the same way of his wife, and we all wish him a long and happy married life.

I would like to know if there is any work at inside wiring in St. Louis.

J. L. GUERINOT, *Press Secretary.*

LOS ANGELES, CAL.

Editor Electrical Worker:

I have nothing of importance pertaining to the electrical trade for this issue. There is always more or less talk of new ventures, but nothing has transpired which would indicate an electrical boom in the very near future. The old companies continue to employ the usual number of men and the boys are not idle.

Local No. 61 continues to hold its own, and that is about all we can expect to do under conditions as they now exist. We add three new lights at our next meeting. In the meantime we will probably lose five. Our immediate past President, Bro. J. S. Marsh, has accepted a position with the Capital Telephone Co., of Sacramento, and has gone to that city. Our President, Bro. A. McFarlane, left for Chicago on Sunday last accompanied by his wife. They will spend about three weeks in Kansas City visiting relatives. Our Recording Secretary, Bro. F. E. Peters, has not yet left, but will probably go north in a few days. These brothers are all charter members of No. 61, and have always been active workers in the Brotherhood. Their departure is a serious blow to No. 61. For many terms we have met regularly at our council room, and for years we have worked side by side until it seemed almost as one family. The familiar faces are gone and they carry with them the esteem and brotherly love of every member. To the Locals favored by deposit of card from either of these worthy brothers, we most heartily recommend them to your fraternal care and protection.

Our meetings continue to be quite interesting and instructive. At our last meeting the cathode X rays were very fully explained and illustrated by Bro. Peters. "Line transportation" will be discussed next week, and I understand some of our orators are loaded.

W. A. WOODIS, *Press Secretary.*

HOUSTON, TEX.

Editor Electrical Worker:

Our sister Unions who no doubt long since came to the conclusion that No. 65 was dead and buried, will be surprised to hear from us again. We were not dead, but sleeping and suddenly awoke to realize that we were being left behind in the grand march of the Brotherhood.

On May 24th we held a rousing meeting and in addition to getting our old delinquent members to settle up, we initiated nine new members and settled our indebtedness with the General Office. Bros. Farley and Shallert, of Union No. 71 of Galveston, were present at the meeting and

gave us some good advice which our members all seemed to take well to heart. The meeting lasted for four hours and all pronounced it the best meeting they had ever attended.

We will try to hold interesting meetings in the future and have started a course of electrical discussions which promise to be very beneficial to our members.

Bro. Flynn, formerly of Atlanta, deposited his card in our Union.

Work in Houston is very good at present and all the members of No. 66 are at work. There are very few non-Union men in the city and in a short time there will be none, for those who will not join or are not competent to join will find our climate so uncongenial that they will move on. Nearly all the contractors in this city will hire none but Union men, as they find it pays best in the long run to have their work done by competent Union men.

We desire to extend our hearty thanks to Bros. Farley and Shallert and can assure them that they will be ever welcome to our city as well as all brothers who carry clear cards. No. 66.

QUINCY, ILL.

Editor Electrical Worker:

We have very little to report this month, as everything is getting dull in our line in this city. Some of our brothers will be leaving here soon as the telephone work is nearly completed.

Bro. Mallinson, our President, had a narrow escape two weeks ago. He fell from the top of a fifteen-foot stepladder to the street pavement. It only knocked the wind out of him for a few seconds, but then it might have been worse.

Bro. J. F. W. Gentenman has retired from our Union, as he has taken a position as florist at the Quincy Cemetery. He expects to follow that business in the future, but he is all right as a Union man. There are a few of the brothers here that are falling behind with their dues, but we are giving them the limited time to come up and see us. If they will only come to the meetings we will try to help them some way.

Our sympathy is with our brothers in St. Louis, as we suppose they are having their own troubles after the big storm they have had. Bro. McIntyre and Bro. Johnson left here the day after the storm for St. Louis. They were sent there by the telephone company. I suppose they are telling the boys how we cut them in Quincy, but I do not think they will have much time to spin many yarns from all accounts.

Our circuit is pulling the same amount of lights, and we will add a new light at our next meeting.

EDW. FLAHERTY, *Press Secretary.*

SCHENECTADY, N. Y.

Editor Electrical Worker:

Tempus Fugit. How appropriately we can make use of this old Latin aphorism when we stop to look backward: here it is the month of May and in a few days another issue of the WORKER will be found on our tables. It seems but a day or two since we were perusing the April number.

My contribution this month must be comparatively brief as I have had but very little time to devote to my duties as scribe.

Work at the General Electric plant is exceedingly dull and many of our members have been indefinitely suspended, while many others are working but one or two days each week. Many reasons are advanced for this dullness but I shall refrain from even conjecturing one. Owing to these conditions, Union No. 70 is not at present adding any new members to its membership roll.

Our local papers, as well as other publications, have been publishing articles of late relative to the removal of the General Electric plant from our ancient city to New Jersey, the land of mosquitos. But these flying reports have long since become "chestnuts" and are not only discredited but laughed at by the general public.

The boys of No. 70 are making elaborate preparations to hold a picnic on Saturday the 6th of June, and it is needless to say that we anticipate having a royal good time. We thoroughly believe in that very old adage which informs us that "the early bird catches the worm," although it is not the worm we are after, but the dollars.

Deacon Edmond Strever and Elder Jas. Bruce, not only members of No. 70 but good sincere old-fashioned Methodists and staunch believers in the efficacy of prayer, informed me the other evening that they considered our Union next to their church and that they were so thoroughly interested in its welfare that they were constantly praying that the 6th day of June might be a propitious one for our picnic, financially and otherwise. Of course we all hope the good brothers' prayers may be answered.

I shall draw my communication to a close, trusting that next month I may use more or less of your valuable space with something more encouraging, relative to the condition of business and the growth of No. 70, but before doing so, allow me, Mr. Editor and staff, to extend to you an invitation to our picnic. I can safely prognosticate a very enjoyable time for you all. At least we will exercise all in our power to make it so.

WALTER CLUTE, *Press Secretary.*

SPOKANE, WASH.

Editor Electrical Worker:

The strike in our city which was referred to in last month's WORKER, was of short duration, the company conceding every point to the men, and consequently all are happy. It was a great victory for us, but too much praise cannot be given to the other trades in our city and business men, for the promptness with which they came to our assistance. A number of business men and the Mayor called on the officers of the company and advised them to settle with the boys or they would discontinue using the company's current. Other business houses told the scabs who were employed to trim the lamps, not to come into their stores or they would throw them out.

It may seem a small thing to go on a strike on account of time-and-a-half for a few men working for the street railway company, but there is a great deal more back of this, as the superintendent of the street railway system was pressing himself forward to become superintendent of the Edison company also, and as he had no use for Union men this was to be made a test case and finally when he became superintendent of the Edison company, the Union was to be annihilated. When however we called his little game of bluff he didn't even have a pair of deuces to stand on. After the strike was settled, one of the directors of the company remarked that the company had little show, as the Union owned the town, which is true, because our boys were right and our citizens were determined to see fair play. We were out altogether twenty-four hours, so did not lose much time.

I send you a clipping from one of the local papers, which gives a full account of the trouble and settlement, which you will please publish in full. No. 73.

[The paper referred to came to the office, but during the excitement caused by the cyclone has mysteriously disappeared. As it probably went eastward with the storm, and may be dangling from a telegraph pole somewhere in Indiana or Ohio, any brother who finds it will please return it in time for next issue, so that the editor can save his scalp from the brave Indians of No. 73. —Ed.]

It is Logically Correct.

Let no man become frightened, discouraged or pushed off the track. The historic past fully demonstrates that the trades-union movement is logically correct. No matter how much we would all like to reach a better industrial state in one bound, the conditions that plainly confront us, coupled with the past development of the labor movement, plainly indicate that the surest way to reach better and permanent conditions is along the trades-union route. The plan also has the advantage of obtaining the amelioration of the condition of the members as we unitedly hope and struggle for emancipation.—*Cigarmakers Journal.*

Patent Record.

The following recent electrical patents are reported by Longan, Higdon & Higdon, patent lawyers, second floor Odd Fellows' Building, St. Louis, and 48 Pacific Building, Washington, D.C.:

No. 559,721—System of electrical distribution, Benjamin G. Lamme, Pittsburg, Pa. A means for changing the phase and wave form of alternating electric currents comprising two transformers each of which is provided with two secondaries, those of one being respectively connected directly and reversely in series with those of the other.

Directory of Local Unions.

(Secretaries will please furnish the necessary information to make this directory complete. Note that the *time* and *place* of meeting, the name of the President, the names and *addresses* of the Recording and Financial Secretaries are required.)

No. 1, St. Louis, Mo.—Meets every Tuesday at s. e. cor. 21st and Franklin avenue. Chas. De Marr, Pres., 4340 Easton Ave.; W. S. Peebles, R. S., 5147 Wells ave.; J. P. Casey, F. S., 2202 Spring ave.

No. 2, Milwaukee, Wis.—Meets 2d and 4th Wednesdays at Bauer's Hall, 304 W. Water st. M. J. Quirk, Pres., 87 27th st.; R. F. Marquardt, R. S., 780 17th st.; Geo. Poehlman, F. S., 647 2½ st.

No. 3, Denver, Col.—E. L. Layne, Pres., 1011 19th st.; Geo. P. Manning, Sec'y, 1633 Lawrence st.

No. 4, New Orleans, La.—Meets 1st and 3d Tuesdays at Carondelet & Perdido sts. J. McGregor, Pres., 2111 Bousseau st.; C. M. Hale, R. S., 630 St. Mary st.; R. B Joyce, F. S., 331 S. Bassin st.

No. 5, New York City, N. Y.—Meets every Thursday at 85 E. 4th st. John F. Bergen, Pres., 528 Henry st., Brooklyn; C. H. Middleton, R. S., 45 Clinton Place; New York City; M. E. Bergen, F. S., 515 Henry st., Brooklyn.

No. 6, San Francisco, Cal.—Meets 2nd and 4th Wednesdays at Forester's Hall, 20 Eddy st.; E. Rush, Pres., room 3 229½ 6th st.; Geo. W. Frost, R. S., 642½ Natoma st.; W. N. Manning, F. S., R. 12, 109 5th st.

No. 7, Springfield, Mass.—Meets first and third Mondays at room 30, new Theatre Block. J. P. Maloney, Pres., 325 High st., Holyoke; H. B. Rust, R. S., Hotel Gilmore, P. C. Fitzpatrick, F. S., 23 Taylor st.

No. 8, Toledo, O.—Meets every Tuesday at Friendship Hall, cor. Jefferson and Summit sts. P. Crowley, Pres., 512 Vance st.; Wm. Callahan, R. S., 988 Vinton st.; J. W. Bramsch, F. S., 2237 Jerome st.

No. 9, Chicago, Ill.—Meets every Saturday at 184 E. Madison st. A. E. Duram, Pres., 5254 Lake ave.; W. M. Stockwell, R. S., 184 Madison st.; H. Knapp, F. S., 67 Edson ave.

No. 10, Indianapolis, Ind.—Meets 1st and 3rd Monday at 29½ W. Pearl st. John Berry, Pres., care of headquarters Fire Dept.; W. O. Dudley, R. S., 124 E. Ohio st.; E. C. Harmag, F. S., Rooms 5-7 Cyclorama Bldg.

No. 11, Terre Haute, Ind.—Meets 2d and 4th Tuesdays at 6th and Main sts. C. D. Updegraff, Pres., 529 S. Ninth st.; M. Davis, R.S., 918 N. 9th st.; W. M. Schaffer, F.S., 114 N. 14th.

No. 12, Evansville, Ind.—Meet every Tuesday at cor. 3rd and Sycamore st. Harry Fisher, Pres., 200 Clark st.; A. L. Swanson, R. S., 1054 Water st; A. K. Grant, F.S., 202 Clark st.

No. 14, Memphis, Tenn.—Chas. E. Blake, Pres., 70 Mulberry st.; J. A. Myles, Sec'y, 208 De Soto st.

No. 15, Philadelphia, Pa.—Meets every Tuesday at 711 Spring Garden st. W. D. Smith, Pres., 254 Chester st.; E. G. Boyle, R. S., Tiger Hotel; H. C. Rawlins, F.S. 254 Chester st.

No. 16, Lynn, Mass.—Meet at General Electric Band Room, 9½ South st. Jas. Robson, Pres., 46 W. Neptune st.; C. W. Perkins, R. S., 6 Allen's Court; E. J. Malloy, F. S., 86 Cottage st.

No. 17, Detroit, Mich.—Meets first and third Thursdays at Trades' Council Hall, 228 Randolph st. T. H. Forbes, Pres., 1220 16th st.; F. Campbell, R. S., 405 Abbott st.; J. G. Forbes, F. S., 745 Milwaukee ave. W.

No. 18, Kansas City, Mo.—Meets every Friday at 1015 Walnut st. W. L. Hutchison, Pres., 1242 Broadway; D. C. Sprecher, R. S., 1208 McGee; J. M. Lynn, F. S., 1032 Summit.

No. 19, Chicago, Ill.—Meets every Tuesday at 184 E. Madison st. F. Conklin, Pres., 8922 Erie av.; T. J. Prendergast, R. S. 7119 S. Chicago av.; J. Drouin, F. S., 9132 S. Chicago ave.

No. 21, Wheeling, W. Va.—Meets first and third Tuesdays at Trades' Assembly Hall. H. F. Wyse, Pres., Box 111; C. L. Ullery, R. S., Box 111; W. J. Clark, F. S., McClure House.

No. 22, Omaha, Neb.—Meets every Friday in The Labor Temple. J. S. Tobias, Pres., 1615 Dorcas st.; R. Kincaid, R. S., 223 N. 16th st.; J. W. Watters, F. S., 2211 Pierce st.

No. 23, St. Paul, Minn.—Meets second and fourth Fridays at Labor Hall, 3rd and Wabasha sts. Jno. O'Donnell, Pres., 4th & Wabasha sts.; Thos. O'Toole, R. S., 333 E. 6th st., F. Volk, F. S., 175 W. 6th st.

No. 24, Minneapolis, Minn.—Meets 1st and 3rd Wednesdays at 34 and 36 6th st. S. Geo. Heilig, Pres., 18 9th st.; L. R. Stevens, R. S., 18 Western ave.; A. Aune, F. S., 3129 Longfellow ave.

No. 25, Duluth, Minn.—Meets 2d and 4th Thursdays at Room 6 Banning Blk. R. Thayer, Pres., 25th ave. W. & 1st st. F. A. Schulte, R. S., Room 18 Norris Block; L. P. Runkle, Fin. Sec., Room 17 Norris Block.

No. 26, Washington, D. C.—Meets every Friday at 827 7th st., N. W. C. A. Malone, Pres., 48 L. st., N. W.; M. O. Spring, R.S., 815 11th st. N.W.; R. F. Metzel, F.S., 509 11th st., N. W.

No. 27, Baltimore, Md.—Meets every Monday at Hall, cor. Fayette and Park aves. P. H. Wissinger, Pres., 737 W. Fayette st.; J. P. Jones, R. S., 1607 W. Franklin st.; F. H. Russell, F. S., 1408 Asquith st.

No. 28, Louisville, Ky.—Meets first and third Tuesdays at Beck Hall, 1st near Jefferson st. Calvin Beach, Pres., 1020 W. Market st.; Ed. Herpt, R. S., 607 Magnolia st.; Jno. C. Deibel, F. S., 418 Fifteenth st.

No. 29, Atlanta, Ga.—Meets every Sunday at 61½ Alabama st. Geo. Foster, Pres., 100 Walker st.; D. J. Kerr, R.S., 114 Richardson st.; Geo. Raymer, F. S., 121 Rhodes st.

No. 30, Cincinnati, O.—Meets 1st and 3d Mondays at 136 E. Court st. W. Williams, Pres., 605 Broadway; H. C. Genrich, R. S., 403 E. 3rd st.; J. F. Harmath, F. S., 2158 Vernon st., Clifton Heights.

No. 31, Jersey City, N. J.—Meets 2nd and 4th Thursdays at 116 Newark ave. Thos. Watson, Pres., 513 Jersey ave.; F. J. Anderson, R. S., 73 Sussex st.; T. L. Jones, F. S., 36 Wayne st.

No. 32, Paterson, N. J.—Meets 1st and 3rd Mondays at German Union Hall. J. F. Colvin, Pres., 963 Madison ave.; Jos. Maher, R. S., 348 Grand st., Paterson Heights, Paterson, N. J.; John Kane, F. S., 274 Hamilton ave.

No. 33, Newark, N. J.—Meets every Monday evening at No. 58 Williams st. W. J. Curtis, Pres., 12 Beach street; J. M. Eder, R. S., 180 Market st.; W. E. Rosseter, F. S., 175 Sherman ave.

No. 34, Brooklyn, N. Y.—Meets 2d and 4th Fridays at Peters' Hall, 360 Fulton st. E. W. Latham, Pres., 151 Gates ave.; G. H. Collins, R. S., 84 St. Mark's pl.; G. C. Paine, F. S., 151 Gates ave.

No. 35, Boston, Mass.—Meets 1st and 3rd Wednesdays at Well's Memorial Hall, 987 Washington st. M. Birmingham, President, 69 Dustin st., Allston; E. Colvin, R. S., 26 Lexington st., Waltham; J. Bateman, F. S., 2 Pine Place.

No. 36, Sacramento, Cal.—Walter Ross, Pres., 1030 G st.; R. A. Fisk, R. S., 1324 3rd st.; Wm. Laine, F. S., 403 K street.

No. 37, Hartford, Conn.—Meets first and third Fridays at Central Union Labor Hall, 11 Central Row. M. F. Owens, Pres., 63 Hawthorne st.; D. F. Cronin, R. S., 49 Windsor st.; C. E. Byrne, F. S., 16 John st.

No. 38, Cleveland, O.—Meets every Thursday at Room 10, 158 Superior st. W. Cunningham, Pres., 409½ Giddaric st. F. C. Locke, R. S., 131 Bolivar st.; H. T. Race, F. S., 137 Marvin ave.

No. 39, Providence, R. I.—Meets 1st and 3rd Mondays at Phœnix Bldg, 157 Westminster st. H. B. Kelly, Pres., 1950 Westminster st.; M. L. Carder, R. S., 40 Wilson st.; G. D. Higgins, F. S., 8 Carpenter st.

No. 40, St. Joseph, Mo.—Meets every Monday at northwest corner 8th and Locust sts. "Brockaw's Hall." R. M. Martin, Pres., 1702 N. 3d st.; Wm. Dorsel, Rec. Sec., 1708 Calhoun st.; J. C. Schneider, Fin. Sec., 808 S. 5th st.

No. 41, Philadelphia, Pa.—Meets every Thursday at N. E. Cor. 8th and Callowhill sts.; Geo. A. Neal, Pres., 3626 Wharton st.; C. W. Elliott, R. S., 1721 Stillman st.; W. C. Fisher, F. S., 2854 Park ave.

No. 42, Utica, N. Y.—Meets second and fourth Tuesdays at Room No. 5, Western Union Building. L. S. Ward, President, Room 5, Western Union Building; E. S. Allen, Recording Secretary, Room 5, Western Union Building; C. Richardson, F. S., Room 5, Western Union Building.

No. 43, Dayton, O.—J. J. McCarty, Pres., care of 5th st. R. R. Co.; L. C. Williams, R. S., 113 W. 3d st.; P. DeWitt, F. S., 420 E. 2d st.

No. 44, Rochester, N. Y.—T. J. Keenan, Pres., 76 Oak st. John Riley, R. S., 398 Plymouth ave.; J. B. Thistle, F. S., 90 Prospect st.

No. 45, Buffalo, N. Y.—Meets 1st and 3rd Saturdays at 512 Washington st. Wm. Haley, Pres., 262 Pearl st.; G. E. Judson, R. S., 10 E. Eagle st.; H. L. Mack, F. S., 867 Washington st.

No. 46, Reading, Pa.—Lucian Bowman, President; Harry Weidner, Recording Secretary, 225 Pearl street; W. S. Hoffman, Financial Secretary, 109 Peach street.

No. 47, Boston, Mass.—Meets every 2nd & 4th Thursday at 987 Washington st. E. C. McCarthy, Pres., 192 Eustis st., Roxbury; A. E. Gibbons, R. S., 82 Bartlett st., Charlestown; W. H. Nichols, F. S., Pleasant st., Roxbury.

No. 48, Sedalia, Mo.—Meets every Thursday at Second and Ohio streets. C. E. Jackson, President; C. C. Ballard, Recording Secretary, 228 Vermont avenue; Ed. McCoy, Financial Secretary, 1210 E. Eleventh street.

No. 49, Bloomington, Ill.—Meets 1st and 3d Wednesdays at Trades' Assembly Hall. C. P. Snyder, Pres., Box 1015; W. C. Gorey, R. S., 409 S. Madison st.; W. F. Witty, F. S., 421 N. Madison st.

No. 50, Birmingham, Ala.—Meets first and third Fridays at 301 20th ave. C. L. Montgomery, Pres., 620 18th st.; T. A. Thompson, R. S., 2020 10th ave.; P. P. Beatty, F. S., 311 26th street.

No. 51, Scranton, Pa.—Jas. Harding, Pres., 601 Meridian st.; P. Campbell, R. S., 1210 Irving av.; Ruben Robins, F. S., 1223 Hampton st.

No. 52, Wilkesbarre, Pa.—W. B. Coe, President, 141 N. River street; W. F. Barber, Recording Secretary, 415 Wyoming avenue, W. Pittston, Pa.; E. M. Lewis, Financial Secretary, American Tel. and Tel. Company.

No. 53, Harrisburg, Pa.—John Moyer, Pres., Balm and Ralanius sts.; Jas. Emminger, R. S., 25 N. 15th st.; C. Anderson, F. S., 46 Summitt st.

No. 54, Peoria, Ill.—Meets 1st & 3rd Wednesdays at 301 Main st. H. Schearer, Pres., 219 W. Jefferson st., Harry Dunn, Rec. Sec., East Peoria; L. C. Crawley, Fin. Sec., 115 Washington st.

No. 55, Des Moines, Ia.—Meets first and third Tuesdays at Trades' Assembly Hall. L. M. Steadman, President, 114 E. Thirteenth street; Ed. Purcell, Recording Secretary, 1020 E. Sixth street; J. C. Dantremont, Financial Secretary, 310 E. Seventh street.

No. 56, Boston, Mass.—Meets 2nd and 4th Wednesdays at 45 Elliott st. J. Murphy, Pres., 363 Tremont st.; D. J. Barnett, R. S., 98 Silver St., S. Boston; J. H. DeCourcey, F. S., 79 Smith st., Roxbury.

No. 57, Salt Lake City, Utah.—Meets second and fourth Thursdays. F. Smith, Pres., care Citizens Electric Lt. Co.; J. A. Ackley, R.S., care R. M. Jones; E. Mill, F.S., 67 Main st.

No. 58, West Superior, Wis.—Meets first and third Wednesdays at rooms 3 and 4 1602 3d st. R. F. Pfleger, Pres., Superior Water, Light & Power Co.; G. C. Hehl, R. S., 405 Pughitt ave.; H. Burdette, F. S., 1819 Banks ave.

No. 59, Paducah, Ky.—J. B. Kretts, Pres., No. 2 Engine House; W. S. Nelson, R. S., 220 S. 4th st.; W. A. Koeneman, F. S., 220 S. 4th st.

No. 60, San Antonio, Tex.—Meets every Saturday at Milham Hall, Soledad Block. W. J. Parsons, Pres., 313 N. Laredo st.; T. L. Rose, R. S., 215 Powder House st.; John Lindquist, F. S., 520 Cypress st.

No. 61, Los Angeles, Cal.—A. McFarlane, Pres., 215 S. Hill st.; F. E. Peters, R. S., 842 Bellevue ave.; C. P. Lofthouse, F. S., 746 San Julian st.

No. 62, Kalamazoo, Mich.—A. D. Ayres, Pres.; 534 S. Burdick st.; L. Bellman, R. S., 540 Pine st.; Wm. Hasenack, F.S., 132 W. Cedar st.

No. 63, Tampa, Fla.—Theo. Glinn, President, Pt. Tampa City; W. F. Crofts, Recording Secretary, Lock Box 264; Arthur D. Henry, Financial Secretary, Box 220.

No. 66, Houston, Tex.—Meets first Thursdays and third Sundays. J. W. Howard, Pres., 1713 Houston ave.; S. T. Sikes, R. S., 808 McKee st.; F. A. Peters, F. S., care of Peters Messenger Service.

No. 67, Quincy, Ill.—D. M. Mallinson, P., 1120 Vine st.; Edw. Haise, R. S., 701 Main st.; W. F. Wagner, F. S., 1241 Chestnut st.

No. 68, Little Rock, Ark.—C. J. Griffith, Pres., 15th and Rooker st.; G. W. Wilson, R. S., 826 Marshall st.; W. N. Drugoon, F. S., 1622 W. 3rd st.

No. 69, Richmond, Va.—Meets 1st & 4th Wednesdays at 613 N. Third st. (in rear). E. Vaughen, Pres., 906 N. Seventh st.; J. A. Moss, R. S., 419 W. Duval st.; S. P. Kelly, F. S., 613 N. 3rd st.

No. 70, Schenectady, N. Y.—Meets 2d and 4th Tuesdays at Trades Assembly Hall, cor. Centre and State sts., 3d floor. Wm. Birch, Pres., 809 Albany st.; J. Engel, R. S., 114 Barrett st.; J. D. Betting, F. S., 626 Villa road.

No. 71, Galveston, Tex.—Meets 2nd and 4th Wednesdays. Oliver Lorenzo, Pres., 1606 Tremont st.; D. L. Goble, R. S., 3520 Ave. R½; L. C. Castetter, F. S., 2222 Post-office st.

No. 72, Danville, Ill.—G. M. Girton, Pres., 319 Franklin st. Jas. Merritt, Sec., care of Am. Tel. & Tel. Co.

No. 73, Spokane, Wash.—Meets 1st and 3rd Thursdays at Oliver Hall, 336½ Riverside ave. R. F. Harper, Pres., 906 Broadway; T. H. Denter, R. S., Box 635; W. D. Nickson, F. S., Box 635.

No. 74, Fall River, Mass.—Meets every Monday at cor. Main and Bedford sts. A. F. Swan, Pres., Sec. C. Granite Block.; H. Sweeney, Rec. Sec., 1164 Plymouth ave.; Wm. Jellison, F. S., 108 Snell st.

No. 75, Wichita, Kas.—Ed. Smith, Pres.; Roy B. Cochran, Rec. Sec., care of Tel. Office.

No. 76, Tacoma, Wash.—A. A. Harrigan, Pres., 2504 J st.; C. A. Preston, R. S., 1311 E st.; Jas. Murray, F. S., 1535 C st.

No. 77, Detroit, Mich.—Meets every Friday evening at 133 Bates st. F. C. Soop, Pres., 350 Bagg st.; W. J. Hartwig, Rec. Sec., 291 22nd st.; Archie Miller, Fin. Sec., 254 Randolph st.

No. 78, Saginaw, Mich.—R. Crawford, Pres., 145 Gage st., E.S.; John Strachan, R.S., 336 N. 2d st.; Chas. Ross, F.S., P. O. Box 225, E. S.

No. 79, Austin, Tex.—Meets every Thursday night at Maccabee Hall. M. A. Spurgeon, Pres., Trinity House; G. W. McClanahan, R. S., 506 W. 10th street; R. G. Briant, F. S., Trinity House.

No. 80, Newport, R. I.—Meets every Monday at the foot of Pelham street. C. B. Reynolds, Jr., Pres., 17 Green st.; W. Powers, R. S.; A. S. Gerlee, F. S., 75 John st.

No. 81, Ft. Worth, Tex.—G. E. Moffett, Pres., 213 N. Taylor st.; R. G. Wright, Rec. Sec., 103 W. 1st st.; Martin Doscher, Fin. Sec., 103 W. 1st st.